Florida
WILDLIFE®

September-October 1994 $2.95

Longleaf Pine Forests

**© Florida Game and Fresh Water Fish Commission 1994 Publisher**

### COMMISSIONERS

| | |
|---|---|
| Chairman: Quinton L. Hedgepeth, D.D.S. | Miami |
| Vice Chairman: Julie K. Morris | Sarasota |
| Mrs. Gilbert W. Humphrey | Miccosukee |
| Joe Marlin Hilliard | Clewiston |
| J. Ben Rowe | Gainesville |

### ADMINISTRATION

| | |
|---|---|
| Allan L. Egbert, Ph.D. | Executive Director |
| William C. Sumner | Asst. Executive Director |
| Pete Joiner | Administrative Services |
| Bob Edwards | Law Enforcement |
| Frank Montalbano | Wildlife |
| Smokie Holcomb | Fisheries |
| Bradley J. Hartman | Environmental Services |
| Woody Darden | Informational Services |

### REGIONAL DIRECTORS

| | |
|---|---|
| Greg Holder | South Region |
| Larry Martin | Northeast Region |
| Tim Breault | Northwest Region |
| Dan Dunford | Everglades Region |
| Robert B. Butler | Central Region |

### MAGAZINE STAFF

| | |
|---|---|
| Dick Sublette | Editor |
| Janisse Ray | Assistant Editor |
| Peggy Perkerson | Art Editor |
| Mary Beth Savage | Circulation Manager |

FLORIDA WILDLIFE (ISSN 0015-4369) is published bimonthly by the Florida Game and Fresh Water Fish Commission, 620 South Meridian Street, Tallahassee, Florida 32399-1600. Second-class postage paid at Tallahassee, Florida. Post Office Publication Number 202440. Materials in FLORIDA WILDLIFE include copyrighted materials that are property of individual contributors. Written permission to use the Publisher's materials will be granted by the editor for noncommercial, public informational purposes. Manuscripts, photographs and other submissions are received only with the understanding that the Publisher assumes no responsibility for any loss or damage. Contributors should request "How To Submit" before sending materials.

Single copy price $2.95. Subscription prices in effect through September 1994: $7 for one year (six issues); $14 for two years (12 issues); $21 for three years (18 issues). After October 1st.: one year $10; two years $19; three years $27. Add $5 per year for foreign mailings. Postmaster: Please send address changes to: FLORIDA WILDLIFE, Circulation Office, 620 South Meridian Street, Tallahassee, FL 32399-1600; (904) 488-5563.

## REGIONAL OFFICES

**Northwest Region**
3911 Hwy. 2321
Panama City, FL 32409-1658
Telephone: (904) 265-3676

**Northeast Region**
Route 7, Box 440
Lake City, FL 32055-8713
Telephone: (904) 758-0525

**Central Region**
1239 S.W. 10th Street
Ocala, FL 34474-2797
Telephone: (904) 732-1225

**South Region**
3900 Drane Field Road
Lakeland, FL 33811-1299
Telephone: (813) 648-3203

**Everglades Region**
551 North Military Trail
West Palm Beach, FL 33415-1396
Telephone: (407) 640-6100

**TDD:** (904) 488-9542

## *Wildlife Alert*

Report Wildlife Law Violators

### CALL TOLL FREE

| | |
|---|---|
| Panama City | 1-800-342-1676 |
| Lake City | 1-800-342-8105 |
| Ocala | 1-800-342-9620 |
| Lakeland | 1-800-282-8002 |
| West Palm Beach | 1-800-432-2046 |

This agency and the Department of Interior prohibit discrimination by race, color, nationality, age, sex or handicap. If you believe you have been discriminated against in any program, activity or facility of this agency, write to: Florida Game and Fresh Water Fish Commission, 620 South Meridian Street, Tallahassee, FL 32399-1600; or to: Office for Human Relations, USFWS, Department of Interior, Washington, D.C. 20240.

# Florida WILDLIFE®

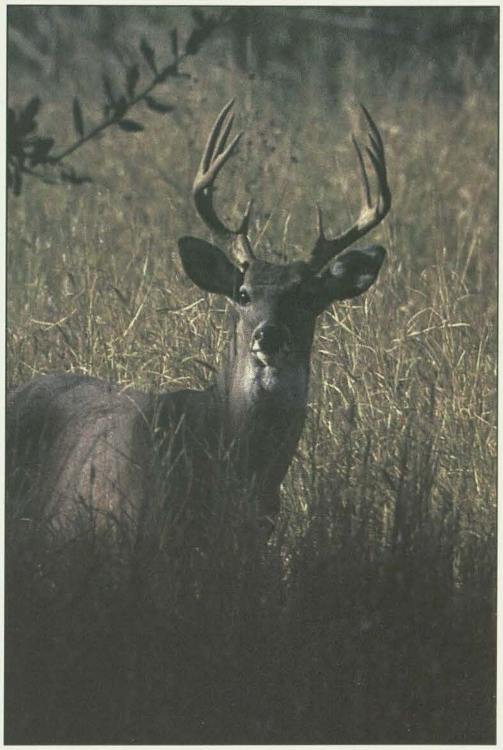
Volume 48, Number 5 September-October 1994

## FEATURES

2 **Florida Uplands: Longleaf Pine**, By D. Bruce Means, Ph.D.
7 **Red-Cockaded Woodpecker Report**, By R. Todd Engstrom, Ph.D.
8 **Longleaf Pine Restoration**, By Janisse Ray
10 **Those Secret Fishing Holes**, By Gray Bass
12 **Big Snakes In Big Trouble**, By Walter W. Timmerman
16 **Project WILD's Schoolyard Action**, By Tim Roach
22 **Timucuan: Florida's Newest National Preserve**, By Daniel R. and Jayne Tardona
24 **Closing the Gaps**, By Randy S. Kautz
27 **Never Say Neve**r, By Duke Hammond
30 **Hunting the Elusive Wood Duck**, By Paul M. Allen

## DEPARTMENTS

18 **1994 Photo Contest Winners**
31 **1994-95 Resident Game Hunting Seasons**
32 **Delicate Balance: Bachman's Sparrow**



*27, Never Say Never*

---

ATTENTION READERS

Florida is rich with stories of nature, and we want to hear yours. Starting with the January/February 1995 issue, FLORIDA WILDLIFE will initiate a reader forum on a specific topic that concerns some aspect of wildlife. In our inaugural feature, tell us what you or someone you know does for Florida wildlife. Your true stories must be brief, no more than 300 words, and should be sent to "Florida Stories," in care of FLORIDA WILDLIFE. Deadline is October 14.

COVERS

Front: Bobwhite Quail, By SOC Clay, Inc.
Back: Duck Hunting, By Marc Epstein

ACKNOWLEDGEMENTS

Tamara Garrett, office manager; Rebecca Rhodes, promotions; Cheri Barineau, circulation assistant; Bill Greer, contributing photographer; Scott Ball, consulting editor; and Rose Printing Company of Tallahassee.

♻ Printed on recycled paper.

## Second In A Series

# FLORIDA UPLANDS

Text and Photographs by D. Bruce Means, Ph. D.

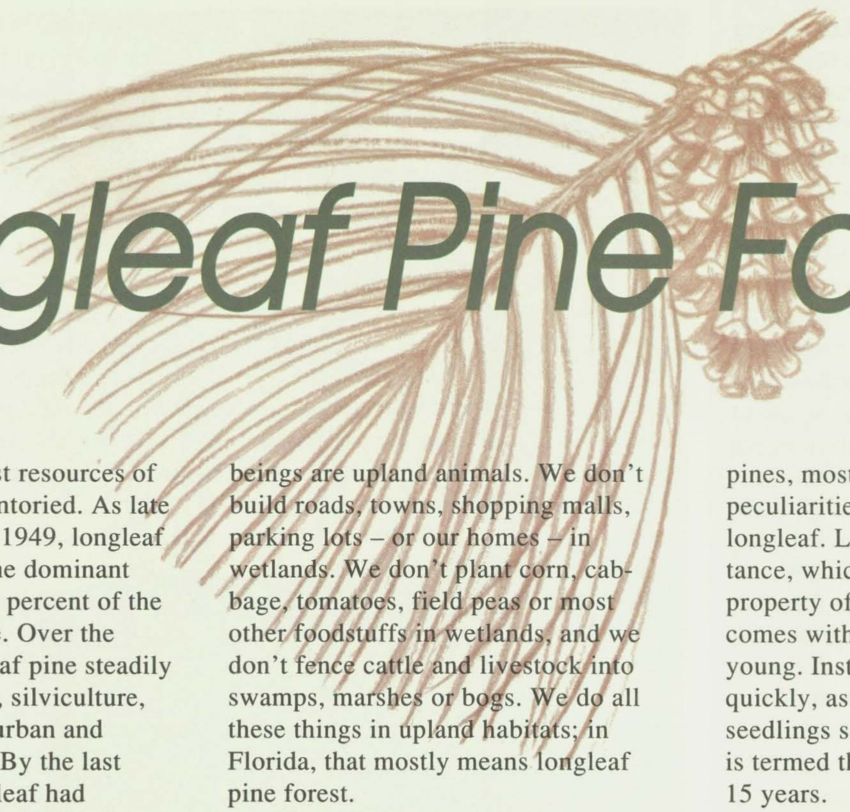
*Old-growth longleaf pine forest in Riverside Island, Ocala National Forest. Young trees are shown in the grass stage.*

In the early summer of 1774, William Bartram rode on horseback from a trading post on the St. Johns River to the Seminole town of Talahasochte on the Suwannee River, making a transect across the upper Florida peninsula through Putnam, Alachua and Levy counties. At least 70 percent of the voyage was through forests of longleaf pine. Today, over the same transect, less than 5 percent is longleaf.

Now, 220 years after Bartram's visit to that part of British Florida, you can't hear the tooting of an ivory-bill nor the plaintive howl of the red wolf. Plains bison calves don't frolic the Alachua Savanna; the passenger pigeon doesn't fly south to Florida for the winter. The red-cockaded woodpecker is endangered; the bald eagle, indigo snake, gopher tortoise, pine snake, gopher frog and Florida mouse are all threatened or species of special concern. Most of these animals, to a greater or lesser extent, have depended upon Florida's extensive longleaf pine forests.

This is the story of Florida's most important natural ecosystem and the dozens of species of plants and animals that are highly adapted to and dependent upon longleaf pine forests. It is a marvelous story about the strongly beneficial role that fire plays in the ecological integrity of this forest. It is a story about connections in nature, and about Florida's rich biodiversity. It is a sad story, however.

Originally part of a vast forest ecosystem estimated at 70 million acres and stretching from Virginia to east Texas, Florida's longleaf pine forests already had shrunk substantially



# Longleaf Pine Forests

by 1936, when the forest resources of the state were first inventoried. As late as the second census in 1949, longleaf pine forests were still the dominant forest type, covering 22 percent of the entire Florida landscape. Over the ensuing decades, longleaf pine steadily gave way to agriculture, silviculture, pasture and range, and urban and suburban development. By the last inventory in 1987, longleaf had suffered an 88 percent reduction from 1949 levels, over a mere 38 years. At this rate, it has been predicted that longleaf pine forests will disappear from all but public lands in Florida by next year, 1995!

Why? What is it about longleaf pine forests that makes them so vulnerable to human activities? Human beings are upland animals. We don't build roads, towns, shopping malls, parking lots – or our homes – in wetlands. We don't plant corn, cabbage, tomatoes, field peas or most other foodstuffs in wetlands, and we don't fence cattle and livestock into swamps, marshes or bogs. We do all these things in upland habitats; in Florida, that mostly means longleaf pine forest.

There is another reason the reduction of longleaf pine forest has been so rapid. To begin with, longleaf pine is by far the superior timber tree in the Southeast. Its wood is denser and more rot-resistant than all the other pines.

Foresters, however, tend to replace longleaf with slash, loblolly or sand pines, mostly because of several peculiarities of the natural history of longleaf. Longleaf pine's fire resistance, which would be a desireable property of any commercial forest tree, comes with a cost: slow growth when young. Instead of growing upward quickly, as most saplings do, longleaf seedlings sit flat on the ground in what is termed the "grass stage" for three to 15 years.

*Newly metamorphosed gopher frogs, Apalachicola National Forest.*

In the grass stage, a thick root collar with insulative bark protects the stem, and a dense ball of long needles surrounds the growing tip of the young pine, protecting it in some unknown way. When the needles burn down toward the bud, moisture liberated as steam may insulate the bud, or choke out fire in combination with a reduction of oxygen needed by the fire. Buds protected by the dense ball of needles are rarely killed, unless the fire is fanned by a strong wind.

During this time the young tree grows a long, thick taproot that reaches far down into sandy soil toward moisture. This taproot serves as a nutrient storage organ so that when the young plant finally starts its height growth, the stored nutrients in its taproot help it shoot up. During this upward growth, the tree delays putting out lateral branches, giving saplings a distinctive bottle-brush appearance. By growing rapidly upward, the young tree minimizes the time its sensitive terminal buds are exposed to ground fires that once were common in longleaf pine forests.

Early foresters could not see economic return in a species that delays height growth, but longleaf pine is also difficult to plant because of the ▷

long taproot, and the survival of planted saplings is often low. It is one of the few Southern pines that masts, which means that periodically all the trees produce cones and seeds in much greater quantities than in average years. For longleaf pine, a good seed crop comes along only once on an average of seven years, and foresters haven't yet learned when to expect a mast year. The large, heavy seeds are easily preyed upon by birds and beetles.

Because of these problems, foresters planted slash pine where longleaf pine used to be. By 1987 slash pine had become the dominant forest tree in the state, accounting for 69 percent of all commercial pine forests and 15 percent of the land area of Florida. It was not intuitively obvious that the replacement of one kind of pine by another would be ecologically harmful. Slash pine is a native species of Florida, too, but it has properties that grossly change the ecology of any site where slash pine plantations replace longleaf pine forest.

Unlike slash pines, which can be grown very densely, longleaf pines don't tolerate much crowding. The canopies of mature stands of longleaf are open and the forests form park-like vistas. Sunlight pours down on the forest floor, stimulating a rich groundcover flora. One of the fascinating paradoxes about longleaf pine forests is that while the tree species richness is very low, the overall species richness is very high. So high, in fact, that there we find the greatest number of flowering plants and the greatest number of breeding birds in Florida. The diverse groundcover supports a rich fauna of insects, amphibians, reptiles and mammals. The gopher tortoise, for instance, lives in longleaf pine forests because the open canopy allows its preferred groundcover foods to flourish.

Slash pines can be grown together in rows so densely that after about 10 to 15 years the canopy closes and not enough sunlight reaches the ground to support the original groundcover diversity. The gopher tortoise, able to live in recently planted slash pine plantations, soon is forced to migrate to find food.

Shading alone, however, is not the whole problem. Because of slash pine's sensitivity to fire, the plantations are not allowed to burn, at least for the first 10 years. During this time many woody species such as gallberry dominate the groundcover and do their share to shade out other groundcover plants. Beyond 10 years, in the continued absence of fire, slash pine plantations become encroached by a more serious group of interlopers – hardwood species from the wetlands. Eventually the combination of dense tree canopy and hardwood encroachment causes a very different ecological condition than existed in the natural longleaf pine forest. Many of the native species associated with longleaf forests disappear.

Longleaf pine forests are not all alike. Tolerant of a wide range of soil conditions, this pine ranges ecologically from the highest, dryest sand ridges and clayhills in Florida, down gentle slopes, through dry and moist flatwoods, and even to the edge of seepage wetlands, the native habitat of slash pine. On sandy soils, longleaf pine associates with turkey and blackjack oaks, two scrubby understory trees. Here, where the soils are hot and dry, the gopher tortoise and other plants and animals tolerant of desert-like conditions thrive. On moister soils in flatwoods, saw palmetto and gallberry are principal associates. Throughout most of the range of longleaf pine in Georgia and Florida, a rolled-leaf bunchgrass called wiregrass is a major understory associate.

Next to the imperiled future of longleaf pine forests, the most important story about longleaf communities is their love affair with an agent of destruction, fire.

One would predict that nonflamma-

*The pygmy rattlesnake is a common inhabitant of longleaf forests.*

*Cool fires burned for weeks at a time in original old-growth longleaf pine forests.*

bility would evolve in plant parts as a major feature of resistance to death by fire. Not so. Longleaf produces needles that have more volatile resins and oils than any other Southern pine, rendering the needles extremely flammable. Wiregrass is also highly flammable. Forester Robert Mutch hypothesized that as longleaf pine adapted to insulate its vulnerable parts from heat, the highly flammable needle litter surrounding the tree gave longleaf a deadly advantage over fire-sensitive competitors. Any thin-barked young pine or hardwood tree, for example, was doomed if it chanced to germinate in a funeral pyre of shed longleaf pine needles.

Fire has been so important in the evolutionary structuring of longleaf pine ecosystems that the timing of flowering and seed production of most of the grasses (especially wiregrass) and many forbs are highly dependent upon fire. In other words, these grasses and forbs will not reproduce sexually in the absence of fire. More than that, not just any old fire will do. Only in the past two decades have we come to learn the importance of fires ignited in the season when natural fires were set by lightning, May-July. You can burn longleaf groundcover from September to April, as cattle graziers did for four centuries, but these plants will not flower. But if you burn from May to July, later in that very growing season, these plants will flower so profusely that the human eye will be overwhelmed with the difference. It is no coincidence that the flowering of these plants is tied to the natural lightning season.

Wander in the groundcover of longleaf pine forest. You can't see your feet because the groundcover is so rank. Wiregrass, especially, sprawls so densely over the ground as to create a springy mat, often calf deep. What chance for successful establishment would a seed have falling here? In the first place, a seed probably wouldn't make it to the soil because it would rest on deep, dry litter. Few seeds can germinate under these conditions. If a seed did reach the ground and germinate, how would it acquire the necessary sunlight to drive photosynthesis and enable it to grow, in the densest of shade created by the groundcover and dead matter from previous growing seasons?

Enter fire. Fire completely eliminates the groundcover. The earth under longleaf pine forests after a fire is black and bare. Fire burns up every blade of grass, every leaf, most stems, green or dead...but it does not kill their roots. If the fire is followed immediately by a rain, fresh green growth can peek through the ashes the next day. Anyone who has watched this phenomenal recovery knows how fast it takes place. Within a couple of weeks a riot of new, lush greenery carpets the scene. If there has been plenty of rainfall to wash the carbon off the tree trunks, it can be difficult to tell the site was black and barren only a month previously.

From the point of view of a seed, think about the condition of the ground after a May-July burn. Dead litter doesn't choke out overhead sunlight, and there are large patches of bare mineral soil on which to germinate. An excess of nutrients are available in the soil, liberated from the dead and live plant tissues that were ashed. Over evolutionary time, those plants with sufficient growing season to produce seed quickly after a burn were more likely to get their offspring into the next generation than relatives who scattered seed on unburned groundcover. Wiregrass did this. So did longleaf pine, since, of all the Southern pines, it alone drops its seed in the fall. They germinate in late fall and winter.

The original longleaf forests did not require a lightning strike every square mile to burn the whole forest. In presettlement times the only barriers to fire were natural wetlands such as lakes, rivers and the steeper stream-valley bottomlands. And in those days, longleaf forests stretched for hundreds of square miles. Studies done in the 1880s reported that fires burned for weeks at a time, slowly moving over the landscape. The ▷

original longleaf pine forests probably burned every three to five years, sometimes more often, sometimes less.

Longleaf pine lives to the greatest age of any Southern pine, more than 450 years. Probably fewer than 3,000 acres (0.004 percent) of old-growth longleaf pine remains, scattered about in small patches over its original range, since almost all of the original timber was cut during the Great Depression and World War II. Second-growth longleaf pine is harvested when its commercial value peaks at about 50 years, so unless some conservation effort is made to allow some longleaf pines to live out their natural lives, there will be no more trees suitable for the red-cockaded woodpecker, nor any dead, standing snags for all the birds who utilize dead trees for their nesting cavities.

The more we study nature, the more we discover the importance of connections. Many people would not miss the red-cockaded woodpecker, which excavates its nesting cavity in old trees affected by the wood-softening heart-rot fungus, should it go extinct, but consider this: The red-headed woodpecker and the wood duck would miss it. So would the flying squirrel, the honey bee and numerous other animals that utilize their abandoned cavities. The gopher tortoise excavates a burrow averaging 30 feet long in longleaf pine forests – over 100 species of arthropods and vertebrates have been found to utilize this burrow. Both the woodpecker and the tortoise are vitally connected to the ecology and survival of other animals. Because animals and plants are intimately connected in nature, each species' worth far exceeds its own presence. The same goes for entire communities as well.

If any community in the world could be called a "keystone community," it is the longleaf pine ecosystem. Just one example of its importance to the survival of other communities should suffice. In sandy flatwoods from North Carolina to Texas, where gentle slopes intercept a shallow water table, seepage communities of great biodiversity are found. These herb bogs, where most of our carnivorous plants grow, contain up to 50 species of plants per square meter, more species than has ever been measured at that scale anywhere on earth.

Just downslope through the herb bogs another wetland community is dominated by evergreen shrubs in a dense tangle. These are all hardwood species sensitive to fire. In the absence of fires, these shrubs rapidly invade upslope into the herb bogs. Since all of the species of the herb bogs are heliophiles, sun lovers, they soon die and disappear from sites that have been invaded by shady evergreen shrubs. Where does the fire come from that keeps the shrub species out of the herb bogs? It usually burns downslope out of longleaf pine forests. No longleaf pine forests, no fire, no herb bogs. This vital connection between two species-rich plant communities has persisted so long that most of the grasses and many forbs in the herb bogs only flower and set seed vigorously after fires between May and July!

Longleaf pine forest contributes, more than any other ecosystem in Florida, to our state's biodiversity, both directly from its own species richness as well as indirectly through its "keystone" role in the maintenance of other communities. This connectedness should make us realize that people are connected with nature too. We have been ignoring those connections for a long time – so long that, for the longleaf pine, sadly, the eleventh hour has arrived.

*D. Bruce Means, Ph.D. is an ecologist, and the founder and director of the Coastal Plains Institute. His feature on beech/magnolia forests, scheduled for our next issue, will conclude the upland series.*

# Red-Cockaded Woodpecker Report

By R. Todd Engstrom, Ph.D.

Keeping the endangered red-cockaded woodpecker in Florida pine forests should not be that difficult. The woodpecker is relatively long-lived for a small bird, it is not shy of people, and it tenaciously holds on to its cavity trees. Yet, based on a recent study, the number of red-cockaded woodpeckers in the Southeast declined by over 20 percent in the decade of the 1980s. Changes in land use are contrary to certain habits and needs of the woodpecker, which is why it deserves special attention.

The requirements of the woodpecker occur at three levels: tree, forest and landscape. First, the woodpecker requires living pine trees that are 60-90 years old, depending on the tree species, in which to build cavities. Generally, a group of woodpeckers, composed of a mated pair and sometimes additional "helpers," maintain several cavity trees in what is called a cluster. On the forest level, one group must have a pine forest as large as 200 to 300 acres to use for foraging the insects and other arthropods that are the woodpecker's primary foods. Finally, because the bird is very social and non-migratory, one group must live close to other groups: when one member of a group dies, an individual from a nearby group can fill the vacancy, maintaining population structures.

Any approach to conservation of the red-cockaded woodpecker must take all three scales into consideration. Saving a few cavity trees or even a forest of several hundred acres is not enough. Wildlife biologists have to think about a landscape of forests to adequately provide for the woodpecker.

Pine forests throughout the southeastern coastal plain, the range of the red-cockaded woodpecker, have become younger, smaller and more fragmented during the past 100 years. The separation of populations of the woodpecker into smaller groups that are farther apart makes it difficult for individuals to find mates. As if that weren't enough, the preferred habitat of the woodpecker, the longleaf pine forest, is being converted to loblolly and slash pine plantations in which trees are grown for relatively short periods of 30 to 50 years before they are cut down. These forests are of little value to the woodpecker.

One scientific forecast predicts that by the year 2005, there will be more planted pine plantations than natural forests in the Southeast. Acreage of private timberland in Florida is estimated to decrease from 11.5 million acres in 1952 to 7 million in 2040: a 39-percent drop.

Currently, less than 10 percent of the estimated 1,150 groups of red-cockaded woodpeckers in Florida occur on private land. These groups tend to be in smaller, more isolated subpopulations, which are also the ones that are most likely to disappear. Large populations, such as in the Apalachicola National Forest and Eglin Air Force Base, are cornerstones on which effective conservation of the woodpecker can be built.

Special attention must be given to link isolated patches of red-cockaded woodpecker habitat together since long-term conservation may depend on the degree to which small populations can be tied to cornerstone populations. Quality habitat for the endangered woodpecker – trees and forests – on both public and private land will provide a landscape where the woodpecker can recover.

ART BY PEGGY PERKERSON

## Where to See the Bird

You can observe the red-cockaded woodpecker on state lands at Ochlockonee State Park and Blackwater State Forest in the Panhandle, Three Lakes Wildlife Management Area in central Florida, and the Webb Wildlife Management Area in the southern part of the state. The largest population anywhere is in the Apalachicola National Forest, and smaller populations can be found in the Ocala and Osceola national forests as well.

*R. Todd Engstrom, Ph.D. is an ornithologist at Tall Timbers Research Station where he studies the red-cockaded woodpecker in the Red Hills.*

# Longleaf Pine RESTORATION

## *Volunteers are putting the land back the way it was.*

Text and Photograph by Janisse Ray

This is what Sybil Arbery remembers: walking through the longleaf pine forest behind her girlhood home in Blountstown, going to pick violets by the creek. She would rest there in the grasses, looking up at the sky through the pines, feeling a contentment that, at 80, she has not forgotten.

I want to know if the forest is still there.

"Oh, heavens no," she answers, stirring applesauce as she talks to me on the phone. "It's a tacky subdivision now."

I have been given Arbery's name by Gail Fishman of The Nature Conservancy, who coordinates stewardship activities for the northern part of the state. Arbery is a Conservancy volunteer. She has logged hundreds of hours the past two years on a project that, understandably, is close to her heart: restoration of a longleaf pine ecosystem just 21 miles from her birthplace.

In the early 1980s, The Florida Nature Conservancy purchased 6,300 acres of geologically unique ravine system along the Apalachicola River where, since the Miocene era, seeping water has cut deep clefts into the hardwood forests. Noted for their endemic rarities, as well as many species at the southern end of their ranges, the slopes hold endangered torreya trees, pyramid magnolias and Florida yews.

The problems lie upslope, in the sandhills, where the original longleaf pine/wiregrass community was destroyed in the 1950s by clearcutting and where at-risk wildlife like the gopher tortoise and Sherman's fox squirrel still manage to hang on.

Greg Seamon is the northwest Florida land steward with The Nature Conservancy, charged with restoration of the upland sandhills on the Apalachicola Bluffs and Ravines Preserve. Fishman is his assistant. A friendly man with inscrutable eyes, Seamon's job is to know what happened to the land, and what will happen.

We are sitting in Fishman's office looking at aerial photographs.

This one is vintage 1940. I see the wide Apalachicola River snaking across one corner of the photo. I recognize the ravines – odd, dark shapes, sort of like many-legged chameleons, branching out from the river.

"Here is the tract," Seamon says. "These dark spots are longleaf. The lighter areas are wiregrass."

He passes me another photograph, one taken 19 years later, in 1959. The forest is gone. In its place are perfectly parallel lines, an eighth-inch apart, as if someone had painstakingly drawn slash marks with a ruler across the triangle of land.

"Windrows," he explains. After the trees were cut, the top layer of forest was bulldozed into long 2- to 4-feet mounds, about 150 feet apart. Little groundcover remained. Slash pines were planted, and the ensuing suppression of fire through the tract produced an abundance of woody hardwoods like turkey oak. Another ancient longleaf forest, part of the estimated 3 million acres that grew originally in the state, was gone.

In 1985, The Nature Conservancy decided to restore the Apalachicola Preserve uplands. Using income from the cleared slash pines, they started replanting longleaf. But fire, the driving force of this ecosystem, was missing. Fire needed grasses – wiregrass, andropogon – in order to carry. 1987 saw the beginning of a fire regime, and in 1989, following the discovery by the Conservancy's Fire Management and Research Program of the possibility of wiregrass regeneration, volunteers began collecting wiregrass seed.

I visit the preserve on a hot day in May, the sun high overhead and so bright it makes me squint. The directions I have been given are in miles, not blocks, and the land is flat, a sea of planted slash and sand pine. I top a slight rise and the waves of pines seem to go on forever. This is the heart of paper company land.

From the highway, the preserve looks like just another clearcut, nothing unusual, certainly not like land worth preserving. I turn down a long, sandy lane through turkey oak, persimmon, beautyberry. Longleaf in the grass stage sprouts out of the ruined landscape.

When I drive up, Fishman, dressed in white work pants and a t-shirt, is on the front porch of the house-turned-research-station with a group of volunteers, stripping the fluffy wiregrass seed from hay-colored stems. These stalks were collected in December by volunteers using grass clippers.

I sit and strip seeds awhile. It is laborious work. A postman from Pensacola has brought his young sons to work for the day. They're here to return something to the earth, he says. Arbery is not among the group, but no matter – for the past two years she has come three to four times a week, caring for the nursery for hours at a time.

Already 400 volunteers have participated in the restoration – through prescribed burning, tree-planting, seed collecting, the building of boundary fences, the planting of grasses. "If it weren't for volunteers we wouldn't be nearly as far along as we are," Fishman says. Her tiny turtle earrings dance through her straight blond hair as she amazes me with the magnitude of the project.

These volunteers will plant these wiregrass seeds today. The goal, right now, is to fill the nursery with wiregrass – 70,000 plants. The ground that has been replanted in longleaf may require as many as 25,000 wiregrass plugs per acre, planted a stride apart. Though wiregrass is intact in a few areas of the preserve, about 2,500 acres are left to cover. "So we need to pick up the pace a little," Fishman says.

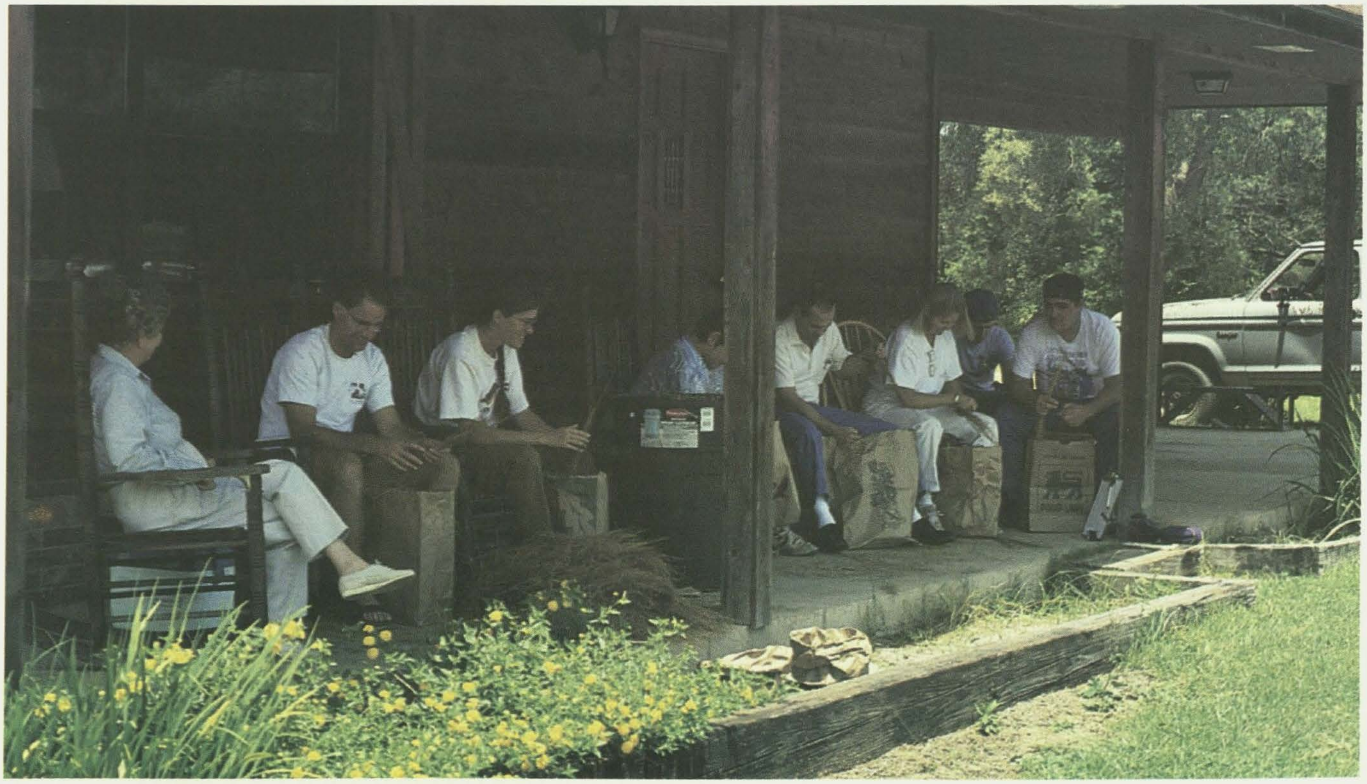
Hard work does not scare Fishman, nor does the greater ghost of faith. What will you call success with this restoration, I ask Fishman. "If it's still going on when I die," she says. Those who lend hands to return this place to the elegant longleaf forest it once was know they will never see that forest. They work blindly, but still they work.

Though the project aims to approximate pre-homesteading, Seamon warns that the forest will never look like it did before. "We're working toward a system that will function as a longleaf pine forest," he says, one with tall trees, regeneration and natural recruitment of groundcover. Because they are pioneering longleaf restoration, progress has been slow. "Every time we answer a question we uncover three or four more," he said. But the new forest has come a long way already. Some of the first pines planted are now 12-15 feet tall.

As the wiregrass starts get old enough, they are planted in a trial site that will serve as a seed source area. The purchase of mechanical harvesting and planting equipment should be possible within a few years. And once the wiregrass is further along, the nursery will include other native forbs associated with this longleaf site, including piney woods dropseed, bluestem (a grass) and the tall-spiring liatris.

One day both the ravines and the uplands will be majestic places. Sybil Arbery can see it already.

*Janisse Ray is assistant editor of FLORIDA WILDLIFE.*



# Those Secret Fishing Holes

Text and Photograph by Gray Bass

Last Saturday, hurried along by a pair of 75-horsepower outboards, you zipped up the river in the rose light of dawn, seeking out the ideal spot. Throttling back at the tip of Wildcat Island, you tipped in the trolling motor, scanned the navigation computer and adjusted the depth-finder. Back in the swamp a squirrel barked; otherwise, only the gurgle of the big stream broke the silence. Before tying on a lure, you probed the swirling eddies with oxygen, pH, temperature and light meters. Fun? Of course. Besides, you landed several nice ones before the sun got overhead. Too bad about the lunker (12 pounds at least) that broke the line. Nice day.

But this is Tuesday, halfway between Neon City and Bear Wallow, and you are en route to your afternoon appointment, with an hour to kill. The radio crackles out the world's problems and the surface of the Interstate clicks past monotonously. Now, where is the time to fish? Where is the place? Did you bring the boat? Of course not, we aren't supposed to fish during the week.

Ah, but like gold, fishing is where you find it. Time is when you take it. Did you ever play hooky from school? Did you ever even fantasize doing it? If you did, by now you cache an ultralight rod and reel, plus a small box of spinners, between your briefcase and sales samples behind the front seat. There is a little bit of Huckleberry Finn in all of us.

Overlooked are many fishing holes we ignore on our path to somewhere else. Get off the pavement and ramble back into the piney woods. Those empty-looking pools beneath those old wooden crossings have fish in them. That clear, sandy stream will also reward a diligent caster.

A few minutes or an hour on a country bridge or forest stream can spawn an angling break. It doesn't take much paraphernalia to accomplish what we are going to label "hit-and-run" fishing. Find a dark pool beneath an isolated wooden span, or a wadeable stream back in the woods. Tie on a spinner and hit the water for a while, then run.

Now, this is not an original idea of mine. For one thing, little boys do this all summer long, but grow up and accept the cock-eyed notion they are not supposed to do this kind of thing anymore. The trick is not to grow up. I know a former salesman who never did. Everywhere he went, he tucked away a fine bamboo fly rod and made a habit of seeking out promising bridges as he traveled from town to town.

With a combined length of 10,500 miles, about 1,700 streams meander through Florida. Of all these twisting miles, only about 3,000 could be called big-water, or accessible by boat. That leaves a lot of creeks and small streams which are generally ignored as fishery resources.

It is true that most small streams do not harbor large numbers of catchable-size sportfish. However, bridge crossings usually form pools, good habitat for gamefish. Streams deep and swift enough to scour out shoreline holes and to accumulate logjams and snags also have fishable populations.

Redfin pickerel are common inhabitants of creeks, especially in the Panhandle where they are often the top predator in the stream food cycle. Kelley Spring Branch, in Blackwater River State Forest, is about 10 feet wide and 1 foot deep, yet it has one redfin pickerel for each 100 feet of stream. However, the larger ones prefer to seek cover and prey in the dark, quiet pool beneath the Forest Service bridge. Also within the same forest, the upper reaches of the pristine Blackwater River are usually wadeable. Where deep holes occur along its banks, especially where drift logs and snags have come to rest, spotted bass find cover. Most bass anglers in Florida have never seen a spotted bass, much less hooked one.

Mind you, this isn't lunker fishing, although you could fetch up a mighty fine shadow bass, stumpknocker, warmouth or longear sunfish. The lighter the tackle the better. The art is to discover spots too small for typical boat fishing, yet large enough to support fish.

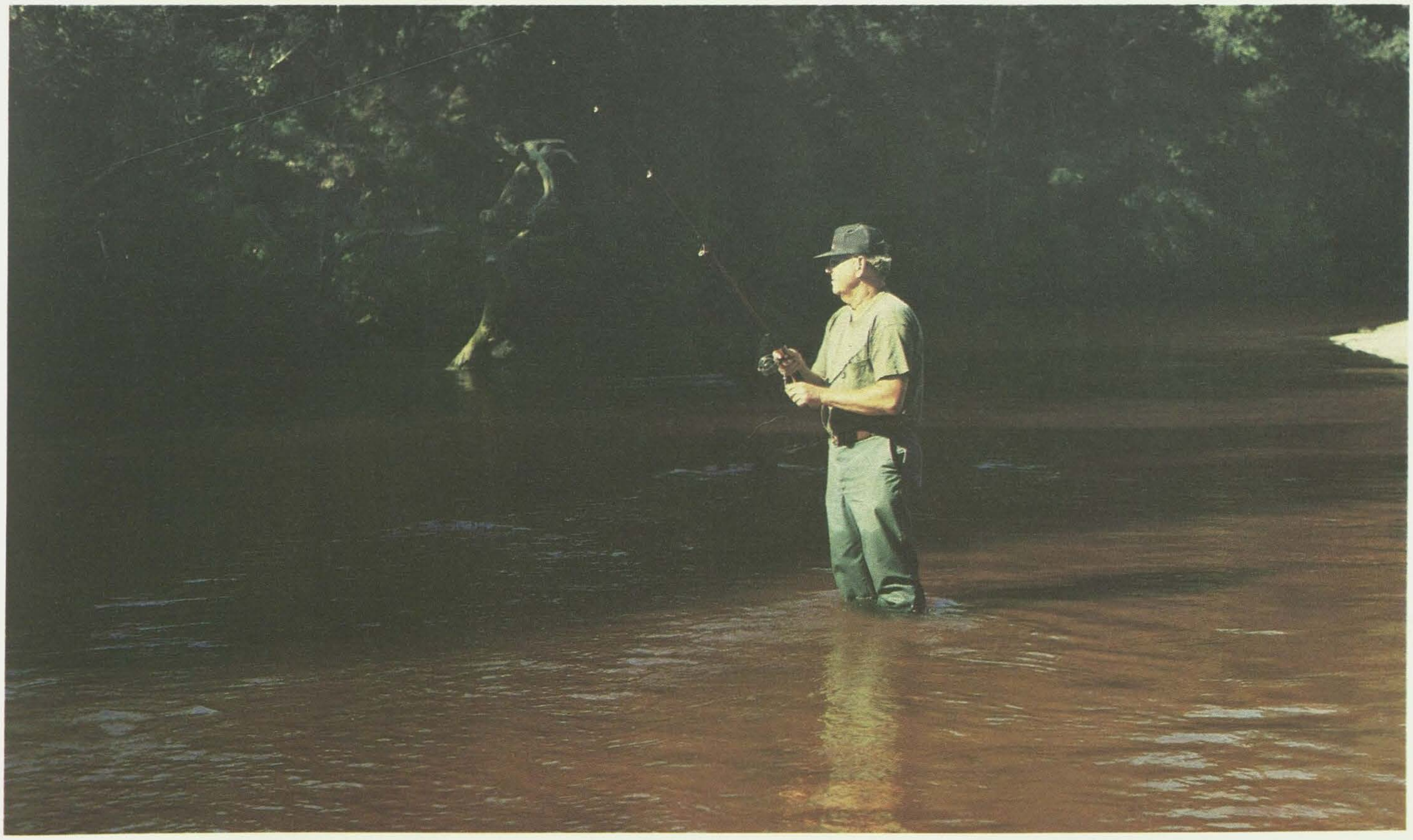
For the small pools under the bridge you need to be able to cast beneath overhanging limbs to entice wary fish from snag-infested cover. Wading the cooler creeks of the Panhandle, such as the Blackwater and Shoal rivers, you must cast into the darker holes, undercut banks and around logs, fallen trees and other woody debris. Fish in these streams prefer to hang close to cover. Your task is to get one out of there without losing your spinner to a hungry snag.

Almost any spinner will do, although I like the snagless type for obvious reasons. Regardless of your choice, you will likely leave a few behind. Since most of your potential trophies are small, $^1/_8$- to $^1/_4$-ounce lures are enough. Two- to 4-pound line is quite ethical. Live bait is great, but you may not have crawdads, worms or crickets behind the seat when you need them. Fly rods work well, especially on streams. And since we mentioned ethics, most dyed-in-the-wool "hit-and-run" anglers release their catches. Who knows, that redfin pickerel may be a state record the next time you land him.

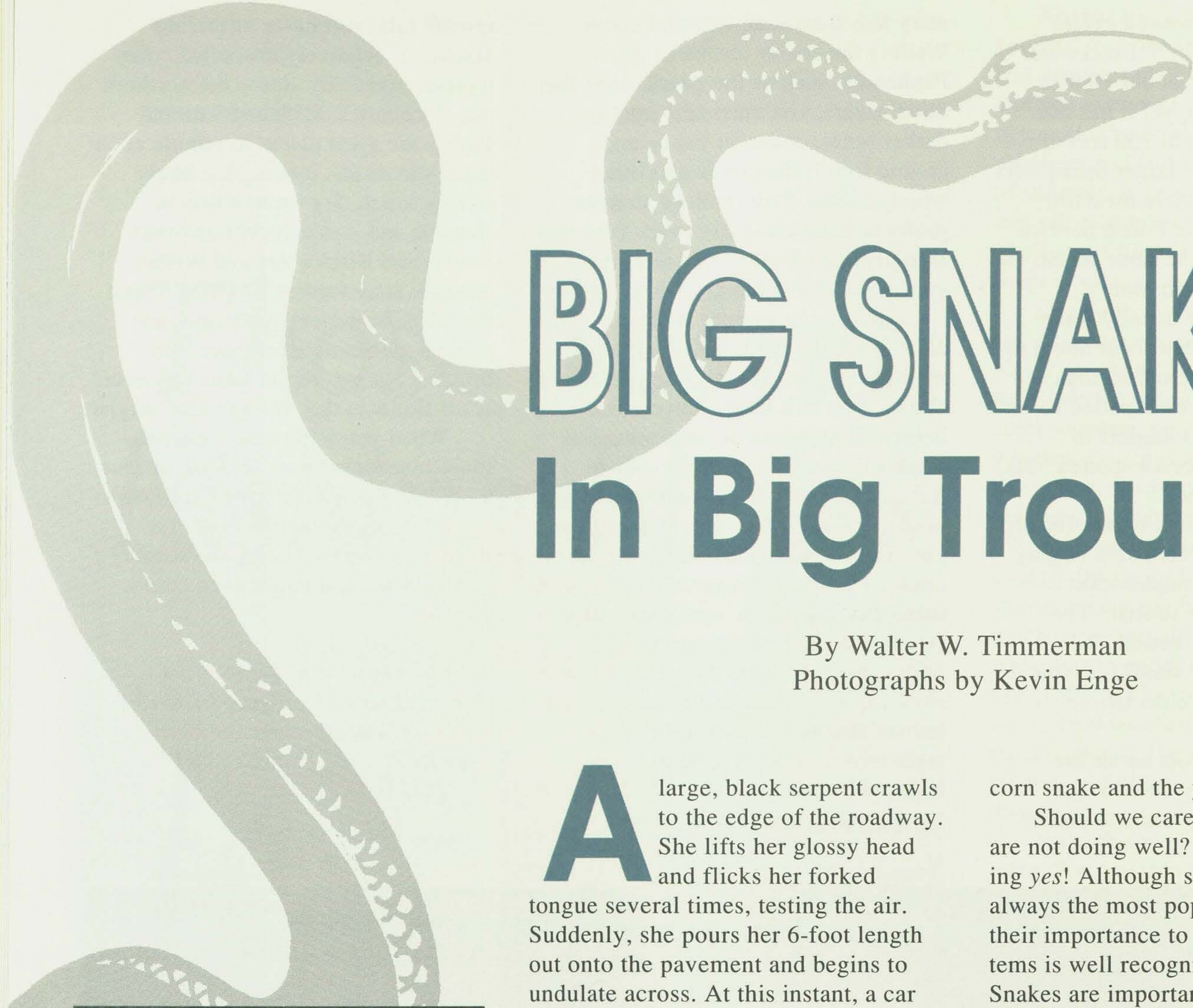
Florida, despite its phenomenal growth rate, still has a surprising amount of relatively unspoiled countryside, especially across the northern tier of counties. State and national forests are great places to ramble about along dirt roads, looking for likely fishing holes. Try forest roads in Osceola and Apalachicola national forests and Blackwater and Withlacoochee state forests. The Gulf Coast counties, from Levy westward, are riddled with isolated streams and bridges. No part of the state, however, is off limits to the "hit-and-run" angler.

When you rattle across one of those lonesome forest bridges, or pass an inviting stream, stop and try your luck. You might be surprised. Undoubtedly you will enjoy the scenery and wildlife, and might even land a fish!

*Gray Bass is director of the Commission's Blackwater Fisheries Research and Development Center near Holt.*

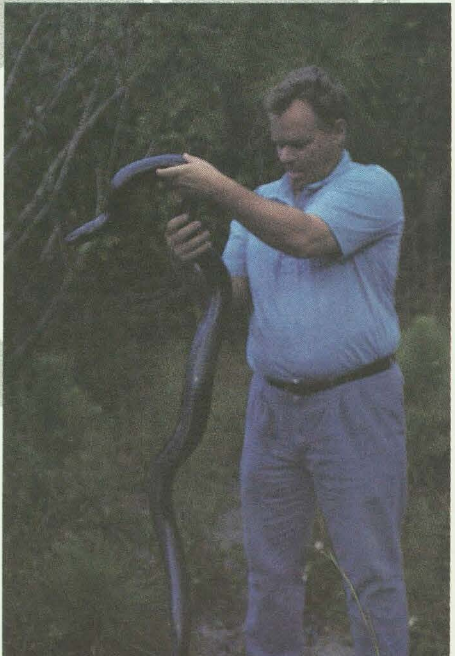


*Robert Carr fishes near Kennedy Bridge at Blackwater River.*



# BIG SNAKES In Big Trouble

By Walter W. Timmerman
Photographs by Kevin Enge



A large, black serpent crawls to the edge of the roadway. She lifts her glossy head and flicks her forked tongue several times, testing the air. Suddenly, she pours her 6-foot length out onto the pavement and begins to undulate across. At this instant, a car appears from around the corner, traveling at high speed. The snake can feel the thunderous vibrations on the roadway. Just in time to avoid the wheels of death, she flings herself into the brush along the road and disappears into palmettos.

This particular story had a happy ending for our eastern indigo snake because she lived to get to the other side. The story often ends in tragedy: death for the serpent, and another valuable member of the breeding population removed from the wild.

Florida's large, upland snakes are declining due to a combination of factors: habitat destruction and fragmentation, highway mortality, malicious killing, and collecting for the pet and skin trades. These species include fascinating and legendary creatures like the eastern indigo, the Florida pine snake, the eastern diamondback rattlesnake, the eastern coachwhip, the corn snake and the yellow rat snake.

Should we care that these snakes are not doing well? I answer a resounding *yes*! Although snakes are not always the most popular creatures, their importance to our native ecosystems is well recognized by biologists. Snakes are important predators in nature, and they, themselves, fall prey to other wildlife. Larger species, in particular, are a natural control on rodent populations in the wild.

When I set out to investigate the subject of big snake conservation, I had many questions. In order to find the answers, I had to rely on the valuable insight provided me by colleagues, and on a scientific paper published in 1990 by The Wildlife Society.

In this paper, Brian Millsap and other Florida biologists used a system to rank 668 native fish and wildlife species in order to ascertain their biological vulnerability. This system is being used by the Florida Game and Fresh Water Fish Commission to help set priorities for the conservation of Florida's wildlife.

Of Florida's large upland snakes, those that ranked most vulnerable were the eastern indigo, the Florida pine snake and the eastern diamondback rattlesnake.

In 1990, in order to gain further insight, and because very little information has been published about snake numbers and population trends in Florida, I interviewed 10 biologists familiar with Florida's large upland snake species. I asked them to give their personal assessment, based on field experiences and other knowledge, of the status of each of the six snake species.

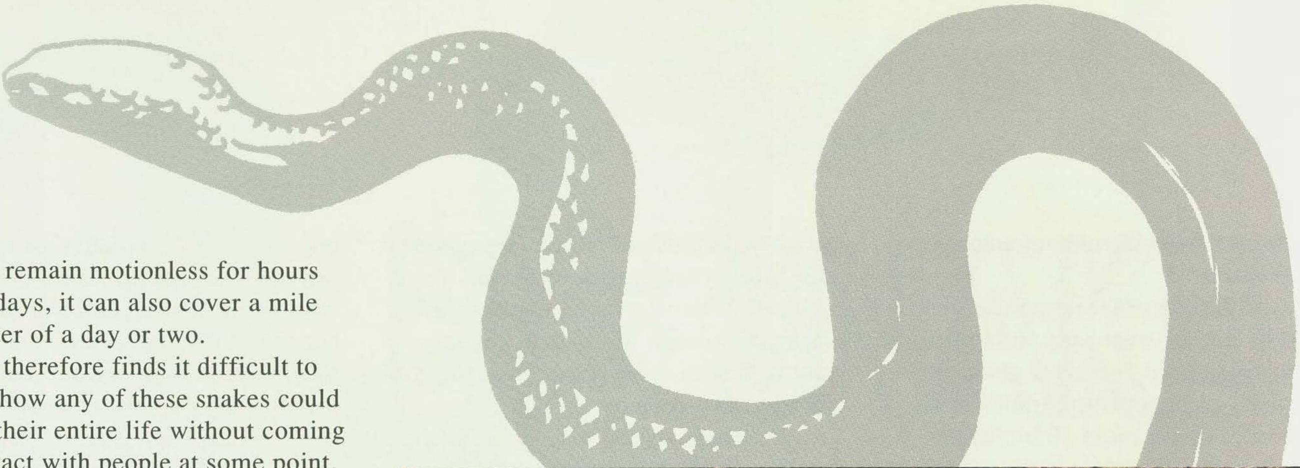
Most panelists believed that large-snake populations are on the decline, as are most species of native fauna and flora. In addition, panel members complained that large individuals were becoming scarce – a large snake today is a real conversation piece. As an example, one panelist related that the average size of hundreds of corn snakes brought in by south Florida snake collectors for the pet trade has steadily diminished. Ten years ago, 4- and 5-foot corn snakes were not unusual. Five years ago, the largest captured were in the 3- and 4-foot range. Within the last three years, no 4-footers have been seen.

Panelists agreed that not all large snakes are equally endangered. The indigo ranked first on the snake panel's vulnerability list, followed by the diamondback rattlesnake and the pine snake, both tied for second. No panelists considered the two rat snake species to be in immediate danger, even though they admitted that their numbers are also declining.

All panelists considered malicious killing and roads as threats to the diamondback rattlesnake, and all agreed that roads were a danger to the indigo. Habitat destruction was the unanimous choice for the greatest threat to the pine snake and the coachwhip. Although it is illegal to buy or sell indigo snakes, or to possess one without a permit, the pet trade was considered a possible threat to this species, and to the two rat snakes, and the skin trade was considered a serious problem only for the eastern diamondback. Overall, the panelists reported that highways were the major threat to large snakes today, followed closely by habitat destruction and habitat fragmentation.

In the last decade, biologists using radio telemetry to track snake movements have discovered that Florida's large snakes often use up to 500 acres in their home range (the area used by a species during normal daily activities for a certain time period, in this case one year. This may change in size and location over time.) Florida biologist Richard Franz tracked one yellow rat snake that traveled over 6 miles in its home range. Although the diamondback rattlesnake hunts from ambush ▷

*Eastern diamondback rattlesnake (above). Page 12 photo shows Walter Timmerman with an indigo snake.*

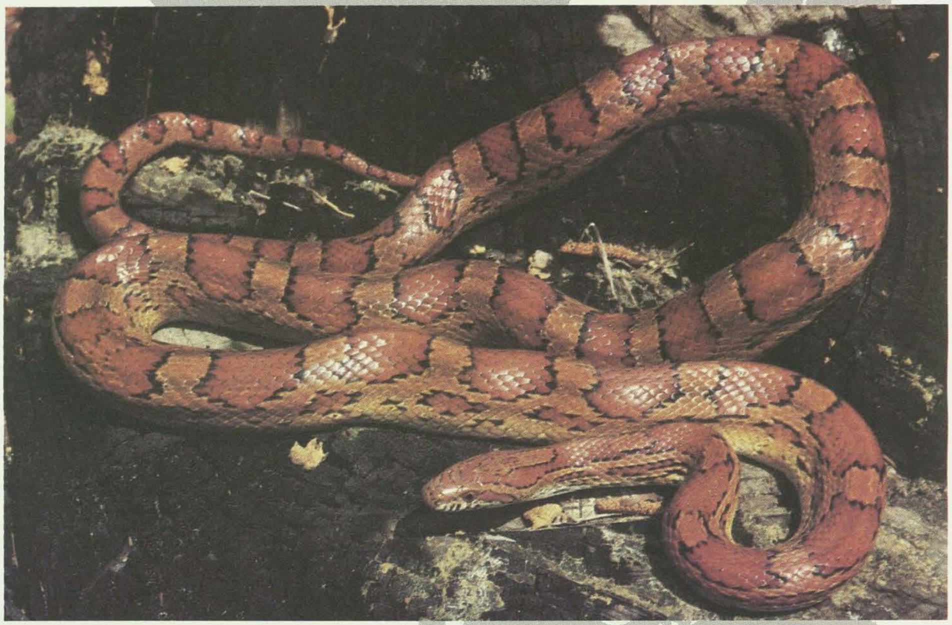


and may remain motionless for hours or even days, it can also cover a mile in a matter of a day or two.

One therefore finds it difficult to imagine how any of these snakes could live out their entire life without coming into contact with people at some point. That's where trouble usually begins.

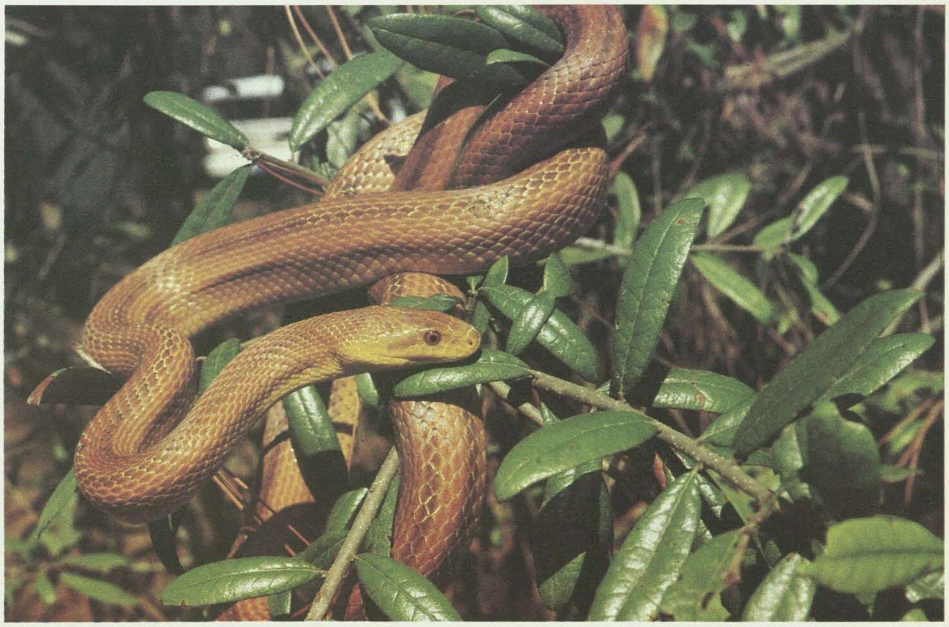
If we are to save these magnificent reptiles, we must begin to respect them and give them the space they need. We must save their environment, including all the plants and animals that are part of it. If we don't act now to protect Florida's large upland snakes, our grandchildren may never experience the thrill of watching a wild Florida indigo disappear into the palmettos.

*Walt Timmerman studied the eastern diamondback rattlesnake for his Master's thesis, and was working as a district park biologist with the Florida Department of Environmental Protection when he wrote this article.*



*Corn snake*

*Yellow rat snake*



# A PLAN OF ACTION

**1.** Help revise comprehensive growth-management and land-use plans. This is where local citizens can have a real impact on the protection of upland habitat by getting involved with local and regional comp plan changes.

**2.** Develop greenlines, imaginary lines drawn around the outside of conservation tracts, for all preserved lands. Activities that take place outside the conservation boundary but inside the greenline may have adverse impacts on the conservation area. Greenlines serve as a useful tool to state and local governments in assessing the types of developments and activities that should or should not take place near conservation lands.

**3.** Use ecosystem management. Our snake species evolved over thousands of years in Florida's primitive ecosystems. Although strides have been made by today's land management agencies, we must continue to demand that conservation areas be managed as entire ecosystems. We should strive to return them to a state as close as possible to conditions prior to European settlement, not favoring one species over another, except in the case of endangered species.

**4.** Develop greenway networks throughout the state. Greenways are corridors of protected land that connect two or more conservation areas, natural linkages in the landscape that allow entire groups of plants and wildlife to interact as they could before the land was developed by humans. Recently, Gov. Lawton Chiles established the Florida Greenways Commission, whose task is to identify 150 greenways across the state by 1995.

**5.** Establish wildlife crossings. Snakes using greenways still have to cross high-speed roadways. Unless we establish a safe means for snakes to cross roads, these green corridors will not function. Highway underpasses have been used successfully around the world to reduce wildlife highway mortality. Snakes should be able to benefit from the same wildlife crossings that other animals use.

**6.** Protect the vulnerable snakes. The eastern indigo, the pine snake and the eastern diamondback rattlesnake are the most biologically vulnerable of Florida's large upland snakes. The indigo and the pine snake are both listed species– the rattlesnake is not. Harvest of this species for meat and skin should be regulated.

*Eastern coachwhip*

# Project WILD Brings Nature to School

By Tim Roach

It was a teacher planning day at Lauderdale Manors Elementary School. I was visiting the Nature Zone, a butterfly garden between two wings of the school. Barry Manin, science teacher and project director for the Nature Zone, had expressed concern that I was coming to visit on a day when no students would be around, that they would be disappointed about missing the chance to share their project with me.

However, students were there. They had come on this vacation day to work on the garden and be a part of what is becoming a statewide trend in education: the installation of wildlife habitat sites on school grounds. The students were tending the butterfly plants growing on the site, refilling the bird feeders and checking the bird boxes for evidence of new activity. The Nature Zone is also a "healing zone," as denoted by a small sign on a birdhouse. According to Manin, students from all over the school can work in the garden at any time. He says that when the students are there, their attitudes improve. Some of the teachers send their disruptive students to Manin – the problem that caused the disruption is soon forgotten as the students dig into the soil with their bare hands to plant new plants, or patiently count the caterpillar eggs deposited on leaves.

As a healing zone the butterfly garden has further meaning. It is dedicated to the memory of a former student, Nathaniel Northcutt Jr., who drowned in an attempt to save his mother. The whole school takes pride in this garden and in its significance.

### Teachers Take Action

Manin, like 12 other teachers around the state, applied for and received a Florida Project WILD Action Grant for an ecology project

GINI BLAIR

that would be carried out on the school campus by students. Offered through the Florida Game and Fresh Water Commission's Office of Informational Services and administered by the Florida Wildlife Federation, it funds installation, enhancement or restoration of habitat sites on the school property. All of the grants, which amounted to $500 or less, were matched by financial and in-kind contributions at the local level.

Six of the awarded projects centered around building a butterfly garden. Lynn Sweetay, a science teacher at J.P. Taravella High School in Coral Springs, directed her Save What's Left Ecology Club in the construction of a butterfly garden in direct view of the school cafeteria. Her project, "Have Lunch with a Butterfly," is a great motivator for students to look more closely at the intricate connectedness of organisms in nature.

Barbara Witt and JoAnn Knowles from Parker Elementary in Panama City received over $1,100 from their community in various forms of support. Their butterfly garden is centered around a combination pond, bird bath and fountain. In addition to plants, three citrus trees were planted as butterfly attractors. At any given time the students involved in the project could recount how many caterpillar eggs had been laid on any given plant.

The class of Chris Fisher, a fourth-grade teacher at Pine Meadow Elementary School in Pensacola, is installing a native perennial wildflower garden that is visible from a number of classrooms. Fisher hopes the native plants, which are being identified by markers, will attract both hummingbirds and butterflies.

Gayle Nance and Annie Boot from Big Cypress Elementary in Naples have chosen to create an area with both a butterfly garden and a dragonfly pond. Site preparation involves a prescribed burn, which will be supervised by the U.S. Fish and Wildlife Service. In addition, students are developing a guide book to the site. This project received recognition in the Spring 1994 issue of *Access* Magazine.

## Restoring Schoolyard Ecosystems

Other projects are tackling ecosystem restoration. Kathleen Carmichael of Buck Lake Elementary in Tallahassee received funding to plant native trees in a hardwood hammock that was destroyed during construction of the school. A plant succession study will be conducted in the hardwood hammock that will eventually become the entrance to a wetland study area.

At Wadsworth Elementary School in Palm Coast, Fran Russell is directing the development of a pine flatwood ecosystem. Approximately 38 trees and 45 plants have been planted at the school site, where photographs record all work completed. Students help in inventory and restoration.

**Teachers use grants to create ecological schoolyards.**

The Socrum Ridge Preserve at Socrum Elementary School in Auburndale was chosen for a Sharing Success Award by the Florida Department of Education. Gini Blair, project director, led her students in turning a retention pond into an outdoor study area, complete with native flora planted by students.

The Panther Path Ecosystem at Pinewood Elementary School in Mims is a project to restore a sandhill community on the school grounds. Cheryl Worden and Stacey Ninos, project directors, chose approximately 1/4 acre for the restoration project. Students will monitor the site for increased use by wildlife.

Pam Stephens and Iris Wilson from Kate Sullivan Elementary School in Tallahassee are directing restoration of a clay hill, high pine ecosystem. Students help plan, plant and maintain the site, where 35 longleaf pine trees have been planted, along with grasses and forbs native to the Tallahassee Red Hills.

In other projects, Dawn Howard of Sea Breeze Elementary in Bradenton directed restoration of a sandhill community that will serve as a model site and a living learning lab. T. Griffith Jones, a science teacher at P.K. Yonge Developmental Research School in Gainesville, heads up a project that includes installing fossil beds, bird and squirrel feeders, a compost pile, and a groundwater test hole. Sue Harrison from Eastside Elementary School in Brooksville directs for the Eastside Environmental Learning Center that includes a mulched path, benches for the "Story Tree," birdhouses and interpretive markers. The Master Gardeners of Hernando County have been assisting with this project, which will include bird baths and an animal track identification area.

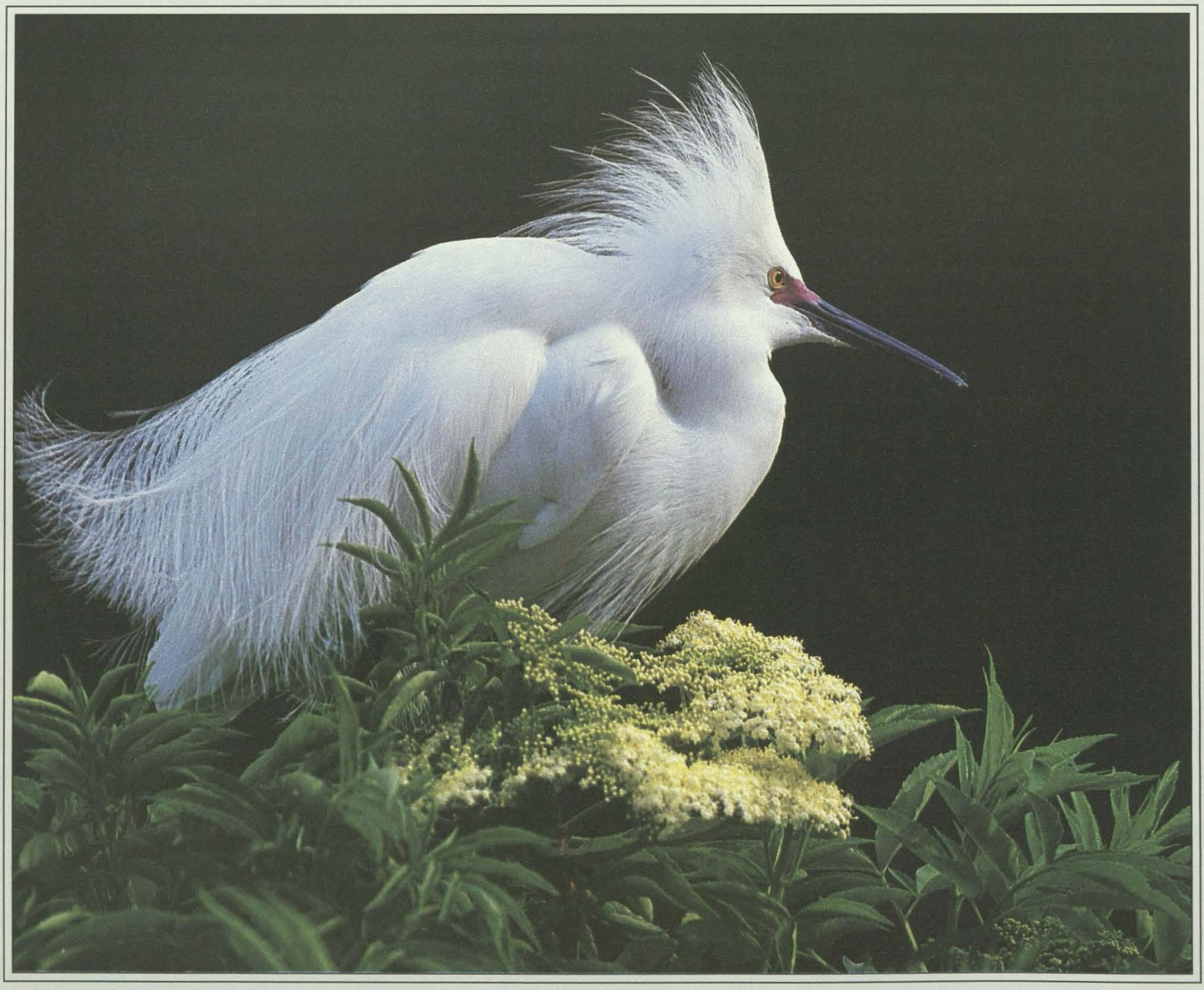
Because of the efforts of committed educators throughout the state, Floridians can expect an increase in the number of butterfly sightings this year, and a heightened awareness of nature and Florida's environment on the part of our young people. This is environmental education at its finest – the looks on the faces of young students peering expectantly into birdhouses, or watching monarchs dance over butterflyweed, say that this is so.

*Former teacher Tim Roach is statewide director of Project WILD, an environmental education program for classroom teachers. For more information, or to contribute to the longevity of the small grant program, call (904) 488-4679.*

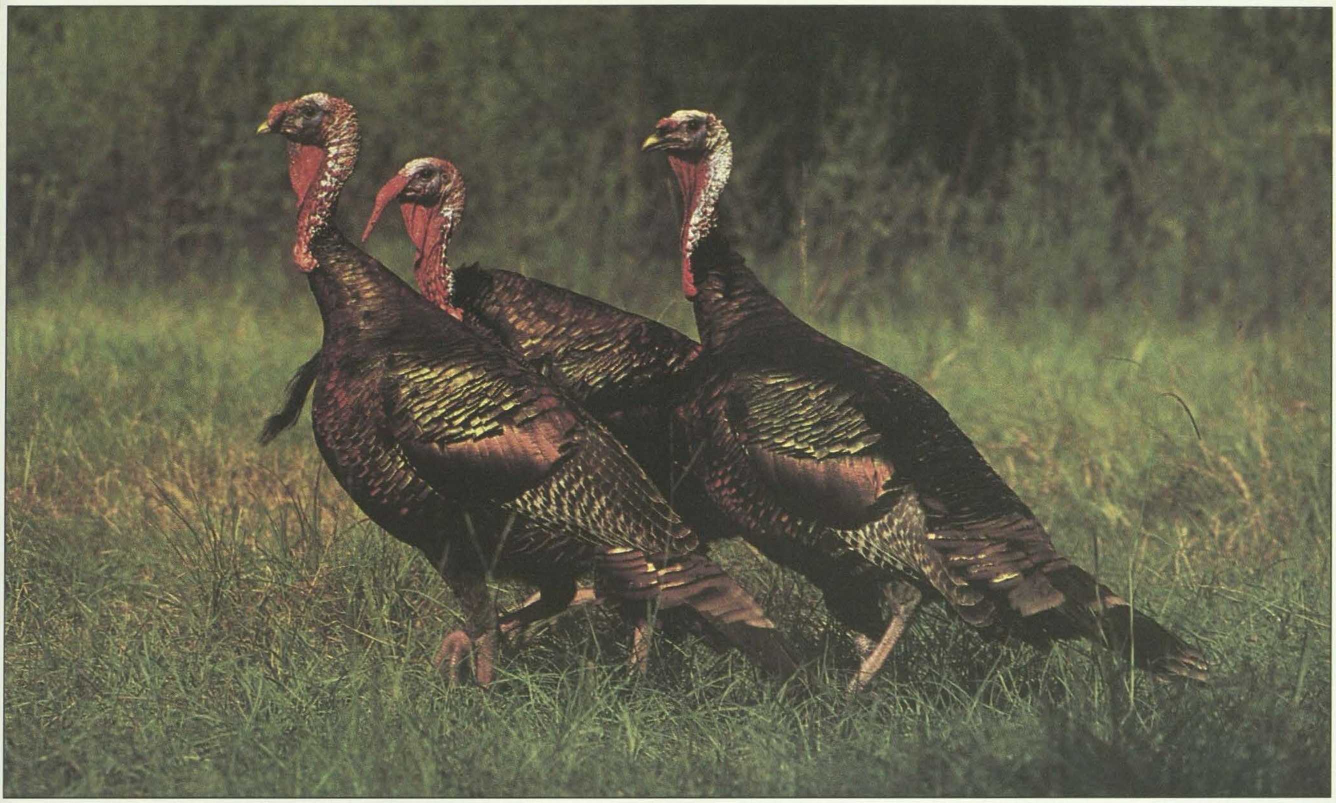
# 1994
# Photo Contest Winners

*On the following pages FLORIDA WILDLIFE presents its 1994 photo contest winners in all three categories – wild birds, wild animals and Florida's natural environment. The winners and honorable mentions in this year's competition were chosen from 250 outstanding entries. An entry form for next year's contest will be published in the March-April issue of this magazine.*

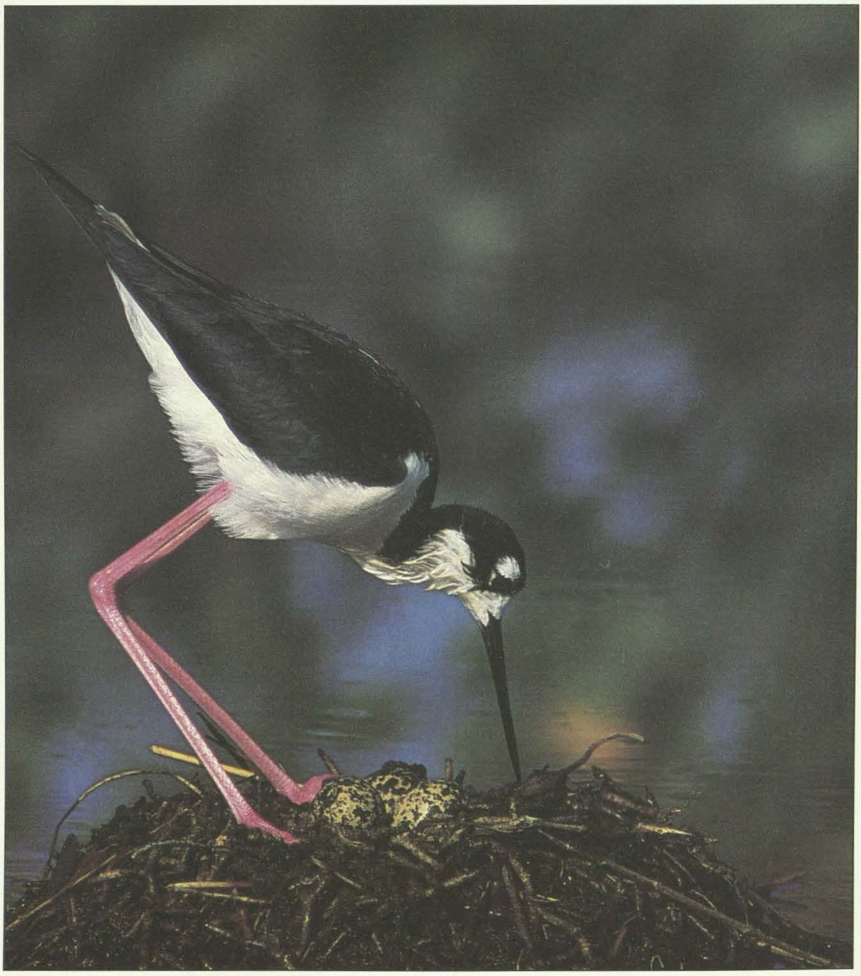
## Wild Birds



*FIRST PLACE: SNOWY EGRET by Emi Allen, Jacksonville, Florida.*



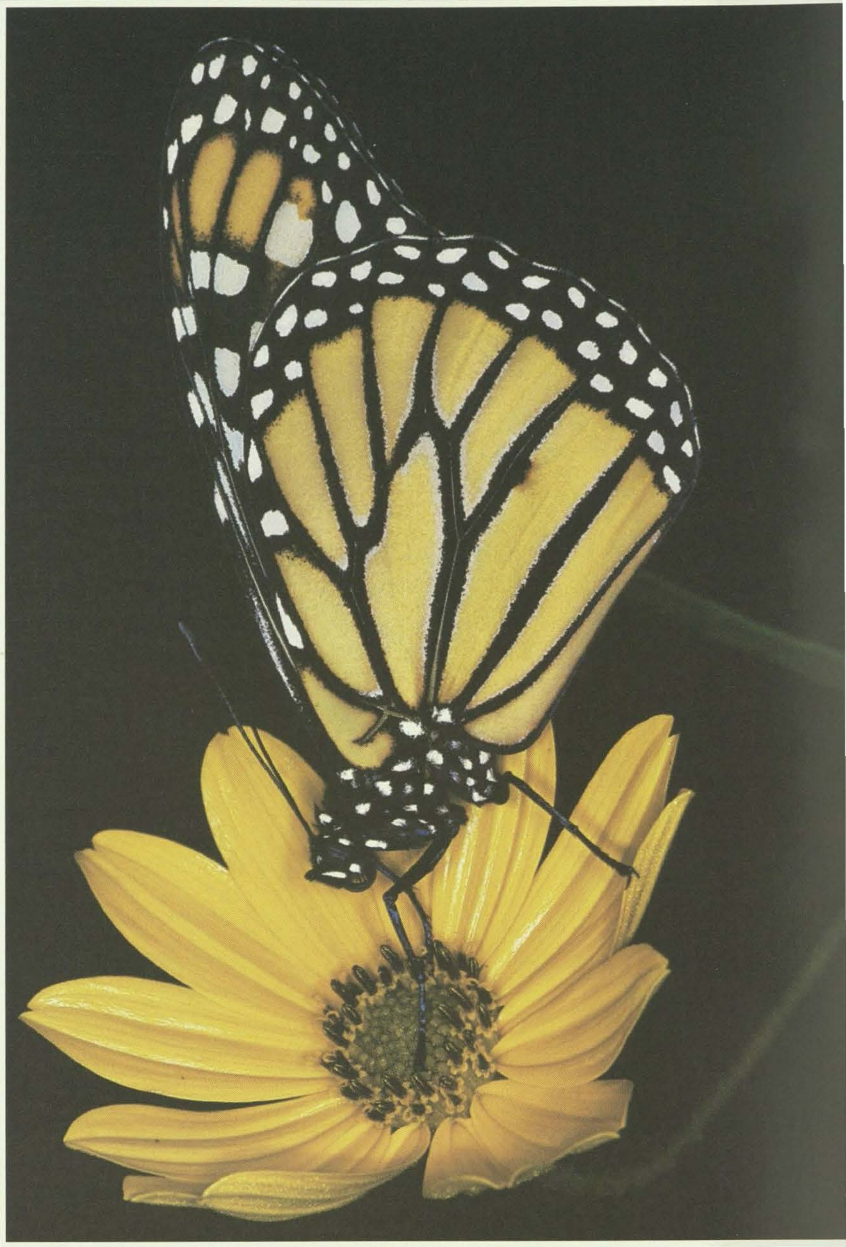
*HONORABLE MENTION:*
*EASTERN WILD TURKEYS*
*by Pat Donnelly, Sarasota, Florida.*



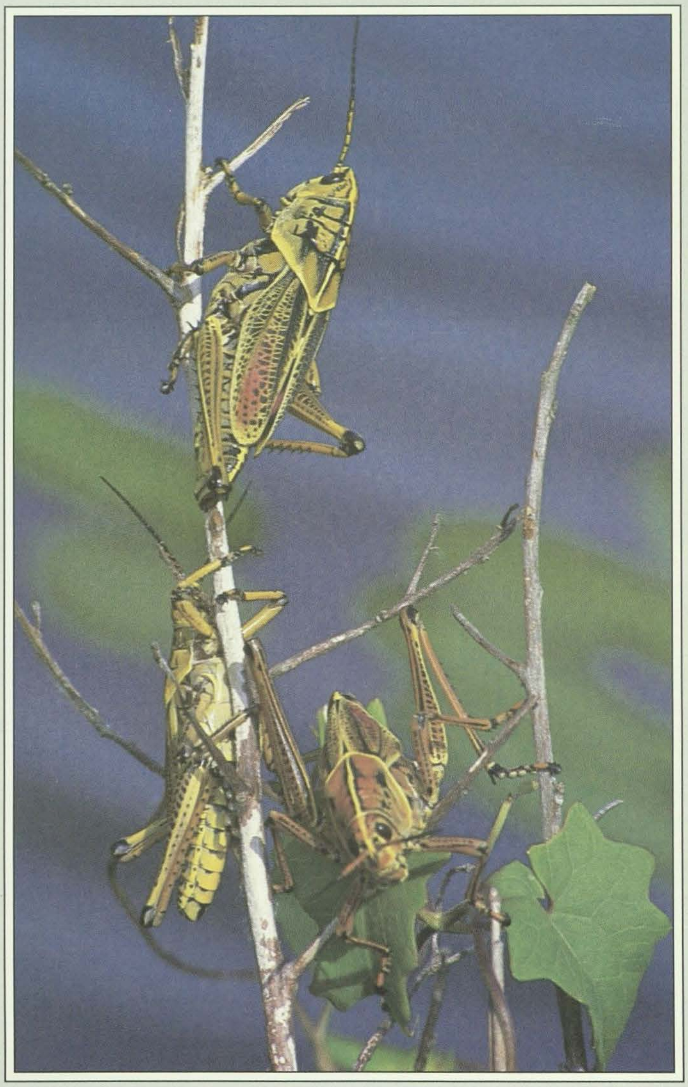
*HONORABLE MENTION:*
*BLACK-NECKED STILT*
*by Bob Paty, Titusville, Florida.*

▷

# Wild Animals

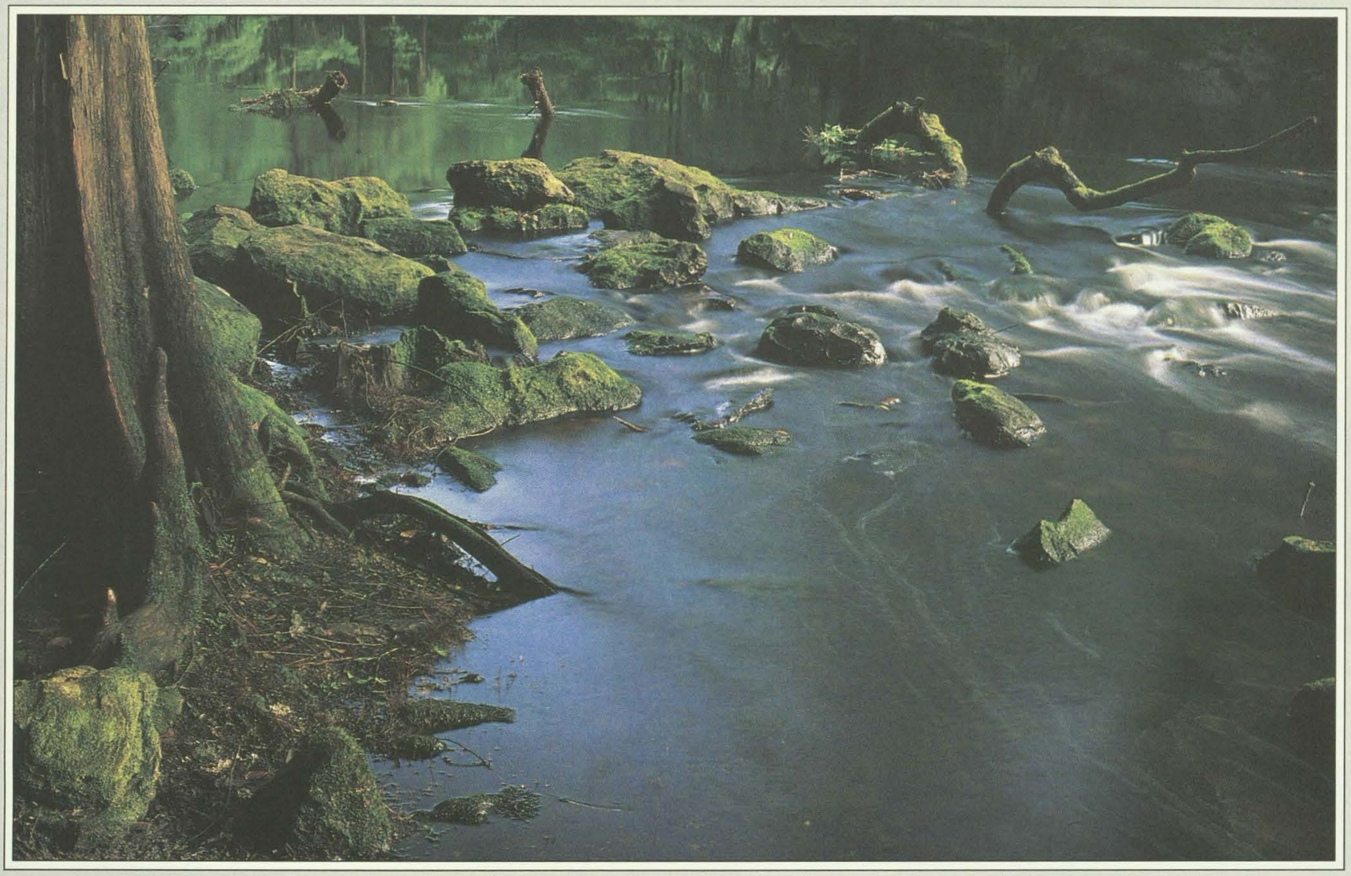


*FIRST PLACE: MONARCH BUTTERFLY*
*by Pat Donnelly, Sarasota, Florida.*



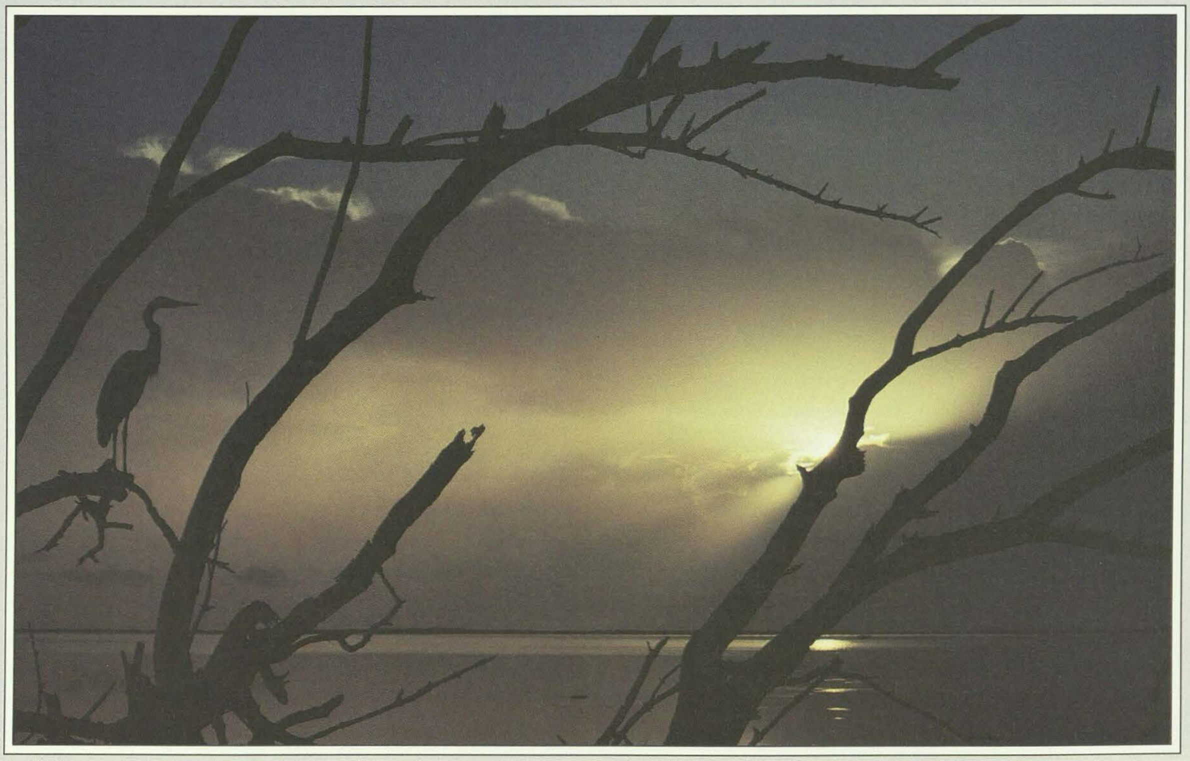
*HONORABLE MENTION: LUBBER GRASSHOPPERS*
*by Dr. Mamoru Yoshida, Boynton Beach, Florida.*

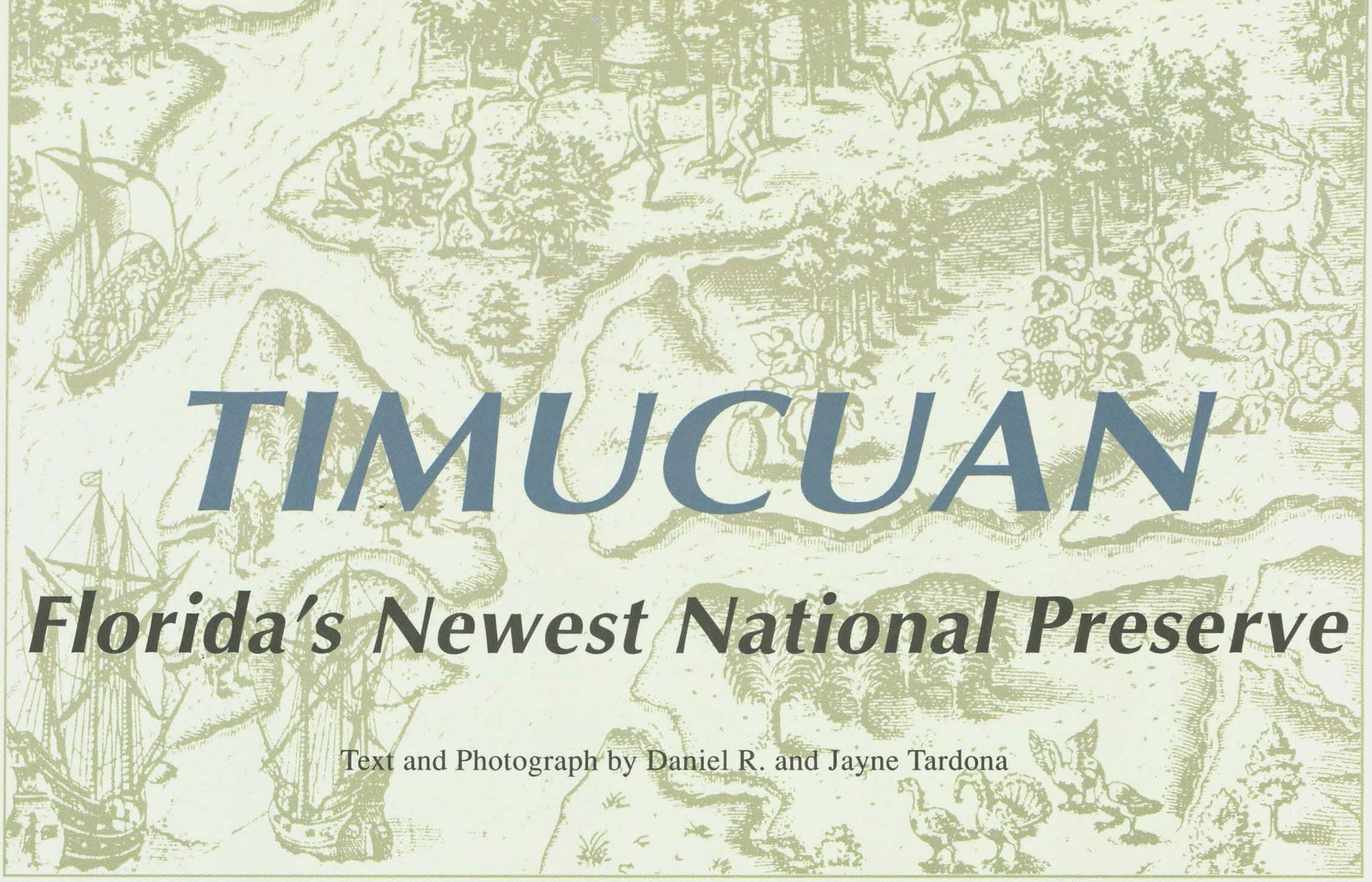
# The Florida Environment



*FIRST PLACE: SANTA FE RIVER by Bob Paty, Titusville, Florida.*

*HONORABLE MENTION: MOSQUITO LAGOON by Bob Paty.*





# TIMUCUAN

## Florida's Newest National Preserve

Text and Photograph by Daniel R. and Jayne Tardona

A stroll down a shaded trail in the Timucuan Ecological and Historic Preserve, the newest National Park Service area in Florida, is one through a lush botanical landscape.

As you walk, a gentle breeze rustles the leaves of trees. Sunlight strokes the living plants and passes through the verdant canopy to touch the trail and guide you on your way. Pines, hickories and oaks speak gently, joined in sound by the laughter of pileated woodpeckers among the trees, or the calls of yellow-crowned night herons flying overhead.

Your walk leads from the chaos of a modern world into the realm of history and prehistory. You are alert for the sight of a rattlesnake or gopher tortoise among palmetto thickets as your feet pass from abandoned road bed to pine needles on sand to oyster shell. A cemetery reminds you of the past, and the ruins of a weathered house and workshop give mute testament to a simpler, quieter life in the 20th century. Evidence of an 18th century British work camp takes you back further, and finally, oyster shell mounds take you further still, to thousands of years of aboriginal harvesting.

You pass out of the woodland to greet the dawn of time and a primordial salt marsh. This is where it all began as people of the native Timucuan nation gathered shellfish for their food. A diverse community of life moves about. Marsh crabs scurry at low tide. A variety of fishes, as well as shrimp and other invertebrates, fill the estuary. The marsh periwinkle laboriously ascends the stems of marsh grasses with the advancing tide. Wood storks, herons, osprey and bald eagles feed upon the provender offered by this tidal salt marsh which lies just out of reach of the sounds of civilization. Easily accessible to visitors, this is the Theodore Roosevelt Area of the park.

The Timucuan Ecological and Historic Preserve encompasses islands and tidal wetlands within its 46,000 acres between the St. Johns and Nassau rivers in Duval County. The preserve is a developing park. About 5,000 acres presently are owned by the National Park Service, with the remaining acreage held by the state of Florida, large corporations and private landowners.

> **The people of the native Timucuan nation once gathered shellfish at this historic preserve.**

While the preserve contains approximately 30,000 acres of wetlands that support diverse wildlife communities, the uplands are important as well. Near the preserve headquarters, open areas of sand laced with patches of wiregrass gain immediate attention. Closer inspection of small scattered mounds of excavated sand reveal the burrows of the gopher tortoise. High above the wiregrass and burrows can be seen the tops of widely spaced longleaf pines. In between, in the understory, the turkey oaks collect. This sandhill habitat is a quickly vanishing natural community.

One can escape the urban environment on trails where long, curved branches of live oak in vestments of ferns and orchids stretch overhead. A multitude of small, wild creatures like fox, raccoons, racerunner lizards, narrow-mouthed toads and a plethora of insects like assassin bugs carry out the daily task of survival. In the hardwood hammocks you may spy a parula warbler collecting abundant Spanish moss, a favorite nesting material.

In the early morning hours along the trail at Ft. Caroline the stillness is suddenly broken by a "whoosh-whoosh" coming up the banks of the St. Johns River. As your ears focus with your eyes you discover a pod of dolphins gliding effortlessly through the waters. Wonder turns to amazement as the dolphins rise and fall in the water, the only sound being the creatures clearing their blowholes.

During midmorning at the Kingsley Plantation, after a thoughtful walk from the slave cabins, you notice movement ahead in the clearing. To your amazement a red-tailed hawk swoops down to the earth in front of you to capture its prey. Later in the day, while boating in the marshes, you glimpse of a small wonder in the grasses – a seaside sparrow, close relative of the now-extinct dusky seaside sparrow. In the early evening in the Timucuan Preserve a small, familiar animal – a fox – prepares for its nightly forays for food.

The Timucuan Preserve is surely a place of natural wonder for those who are patient and willing to take in what it has to offer. Its diverse communities – expansive brackish wetlands, thick hammock, humble freshwater ponds, freshwater swamp, shaded sandy uplands and salt marsh – provide a unique combination of shelter, food and breeding grounds that attract an array of animal species, and a plethora of natural history for all to study.

The Timucuan Ecological and Historic Preserve is located in Duval County. For information call (904) 641-7155, or write: T.E.H.P., Division of Interpretation and Resource Management, 12713 Ft. Caroline Road, Jacksonville, FL 32225.

*Daniel R. Tardona of the National Park Service is the West District Supervisor of the preserve. Jayne Tardona works as an interpretive park ranger at the Castillo de San Marcos National Monument in St. Augustine.*

# Closing the Gaps

## A Plan to Protect Florida's Biodiversity

By Randy S. Kautz

Florida is well known as one of the most biologically rich places in the United States, yet growth and development continue to rapidly consume its wild lands. In order to reverse this trend, the remaining natural areas that are critical to our declining species of wildlife and to our faltering ecosystems must be protected. But which lands are those?

That's where the Florida Game and Fresh Water Fish Commission comes in. Since 1987, nongame biologists of the Commission's Office of Environmental Services have been developing maps of lands that should be protected to meet the minimum, long-term needs of native plants and animals, in order to maintain Florida's biodiversity.

Biodiversity, in simple terms, is the variety of life at all levels of biological organization including genes, subspecies, species, populations, communities and landscapes. As the human population continues its pattern of explosive growth, the variety of life on earth is rapidly being lost as natural systems degrade and species are driven to extinction.

Florida is a good example of these problems. In just the past 50 years, Florida's human population has grown by over 600 percent. During the same period, over 29 percent of Florida's forested and wetland habitats have been converted to urban and agricultural uses. This has led to the extinction of at least 34 species of plants and animals, and the listing of 111 animal species, 17 percent of the total, as endangered or potentially endangered. Moreover, recent studies have shown that the populations of 44 percent of Florida's 668 species of vertebrate fish and wildlife are declining.

**Since population growth and habitat loss are inevitable, we are faced with the problem of deciding which lands are the highest priorities for protection.**

At the community level, the development of Florida has nearly eliminated several natural plant communities from the state, including tropical hardwood hammocks, pine rocklands, coastal strand, scrub and sandhill. Many of Florida's imperiled wildlife species are closely associated with one of these community types.

Human impact on natural processes at the landscape level has a strong influence on Florida's biota as well. Size of the landscape and number and types of communities present affect the biological diversity. Generally speaking, the larger the landscape, and the greater the number and types of communities present, the greater the number and variety of plants and animals.

Human development of the landscape reduces the number of community types present, which in turn may reduce the number of species. In addition, through a process known as fragmentation, the total area of habitat in the landscape decreases as development occurs, and the remaining patches of habitat become smaller and increasingly isolated from one another. Essentially, the habitat occurs as small islands surrounded by a sea of development.

Under these circumstances, species with large area requirements may disappear from the entire landscape. Species with smaller area requirements may also disappear, if the remaining patches are so far apart that dispersing individuals are unable to find appropriate habitats. In such cases, the remaining habitat patches are unable to support a viable population of a species, which gradually goes locally extinct.

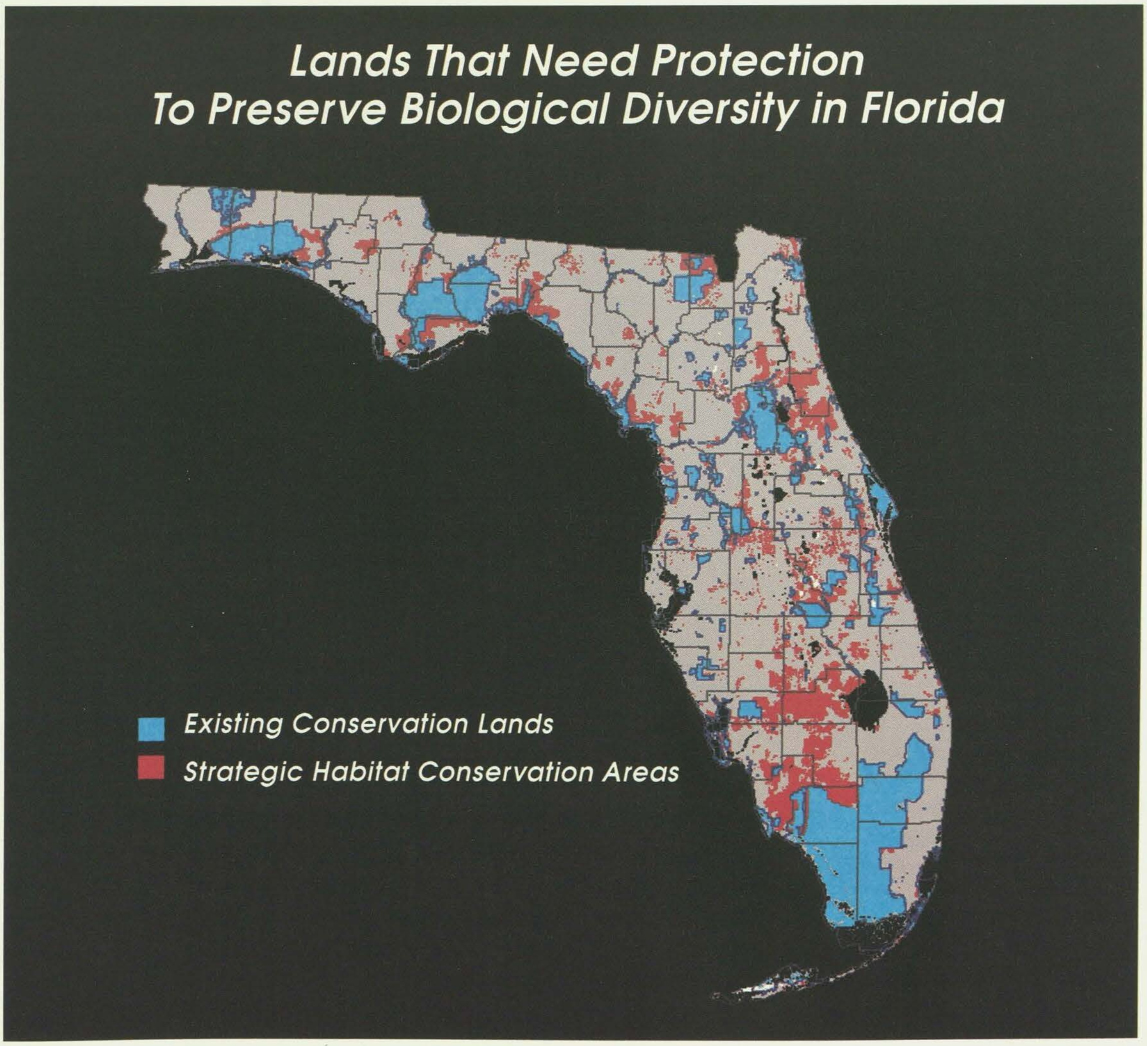
Despite the concern of scientists, many people still wonder why Florida's biological diversity is worth saving in the first place. The justifications most often cited are fourfold. First, the foods, medicines and other products derived from living organisms are essential to human existence. Second, human welfare requires basic ecosystem services such as clean air and water, flood control and moderation of climatic conditions. Third, plants, animals and natural landscapes have beneficial effects on human health and well-being. Fourth, humans are ethically bound to provide responsible stewardship over the planet they dominate.

Given that our biological diversity is worth protecting, Floridians must act quickly. It is inevitable that Florida's population will continue to grow, and, as a consequence, natural habitats will continue to be converted to human uses. Ultimately, we can expect human development to transform the Florida countryside into a sea of hostile habitats surrounding islands of natural habitats confined largely to public lands devoted to conservation. Without intervention, Floridians may expect to see more species slip into extinction, and new species added to the endangered list as time goes by.

Since population growth and habitat loss are inevitable, we are faced with the problem of deciding which lands are highest priorities for protection. Key pieces of information are needed for this effort: 1) Which of our biological resources are in greatest jeopardy? 2) Where are they located? 3) Given that not all important areas can be protected, which lands are of highest priority for protection of biological diversity?

Developing information of this type has been the goal of a group of nongame biologists in the Commission's Office of Environmental Services. For seven years this group has been gathering and analyzing data in order to identify those lands that should be protected to ensure the perpetuation of Florida's native plants and animals.

Given the tremendous variety of species and natural communities found in Florida, developing such information for all biological components was not feasible. Therefore, the project relied on the use of a set of focal species as indicators of biological diversity, selected because they are endangered and in need of habitat ▷


Lands That Need Protection
To Preserve Biological Diversity in Florida
🟦 Existing Conservation Lands
🟥 Strategic Habitat Conservation Areas

protection, because they are indicators of rare community types, or because they are animals that are potentially susceptible to habitat fragmentation. An implicit assumption is that, if indicator species are chosen correctly, protection of their habitat will also provide for the needs of many other species that use the same habitats.

Habitat-based distribution maps were created for each of the focal species using known occurrence data, information on the habitat requirements of each species, and an up-to-date vegetation map derived from satellite imagery. Other factors used to map species distributions included land ownership patterns and other human features, such as highways and urban centers.

The biologists working on this project found that the present system of public lands is inadequate to provide the safety net needed to sustain the existing diversity of life in Florida. They decided that highest priority for protection should be given to those focal species not adequately protected on Florida public lands.

Digitized maps of public lands were overlaid on the focal species distribution maps, and the amount of habitat on each parcel of public land was calculated. This figure was used to estimate the size of the protected populations of the focal species, which was compared to previously determined estimates of sizes needed to maintain population viability. Thirty focal species were found to lack viable populations on existing public lands and were therefore presumed to be highest priorities for protection.

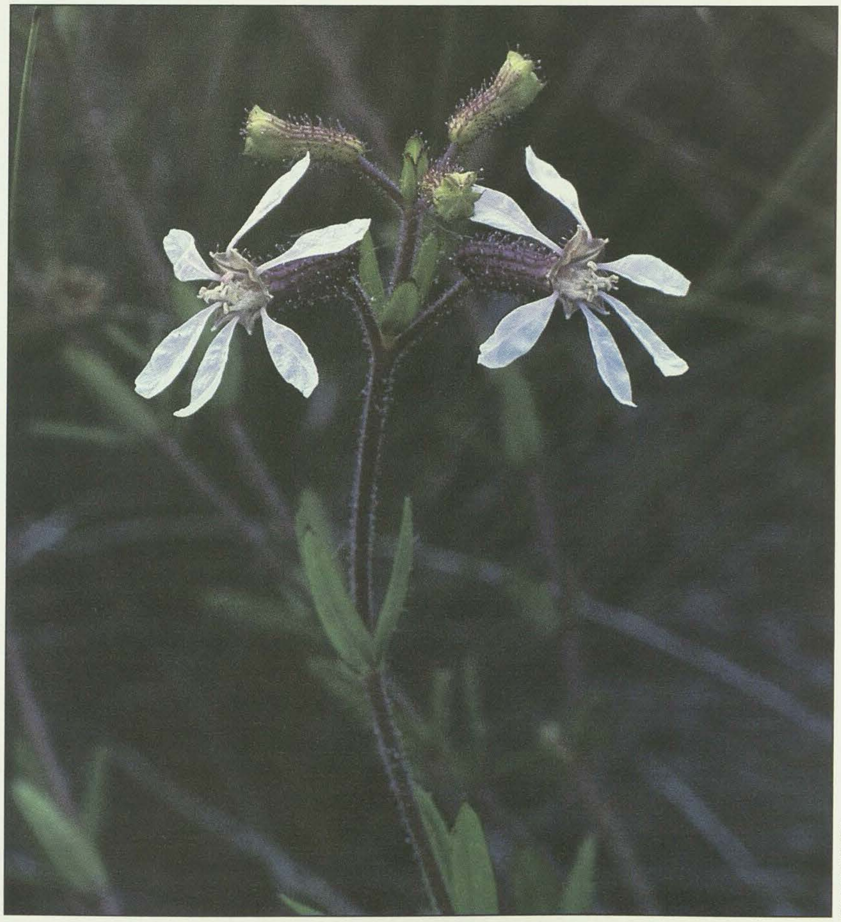
Work then turned to identifying those lands outside of public ownership that should be protected to ensure the long-term viability of the 30 inadequately protected focal species. The maps for each of the 30 species were added together to create a master statewide map of lands in highest need of protection. Because the indicator species approach is not a foolproof method of identifying lands for protection, other endangered components of Florida's biological diversity were added to the master map.

All lands in need of protection were designated Strategic Habitat Conservation Areas (SHCA), which identify Florida lands that are critical for protection of the following components of biological diversity:

- **30 wildlife species inadequately protected by public lands**
- **high-quality examples of the following rare communities:**
  - **(1) scrub**
  - **(2) sandhill**
  - **(3) pine rocklands**
  - **(4) tropical hardwood hammocks**
- **bat maternity and winter roost caves**
- **wetlands critical to eight species of wading birds**
- **lands important to the survival of 105 globally rare plants**

The SHCAs cover 4.82 million acres of Florida, or 13 percent of its land area. The current system of public lands includes approximately 6.95 million acres (20 percent of the state). These results suggest that at least one-third of the state, counting existing areas, should be protected to meet the minimum conservation needs of Florida's biological diversity. It is hoped that this information will be used by public land acquisition programs, regulators, land use planners and private landowners who make decisions that affect the goal of preserving Florida's biological resources.

*Randy S. Kautz is the nongame habitat protection coordinator in the Commission's Office of Environmental Services in Tallahassee. Biologists Jim Cox, Terry Gilbert and Maureen MacLaughlin also worked on the SHCA identification project.*



JOHN PALIS

*Under the plan, some globally endangered plants, like the tropical waxweed, are recommended for protection.*

# NEVER SAY NEVER

By Duke Hammond

## *Deer don't always behave in predictable ways.*

Anyone who has hunted deer knows that superlatives like "never" and "always" don't have much to do with deer hunting. Deer don't always behave in predictable ways.

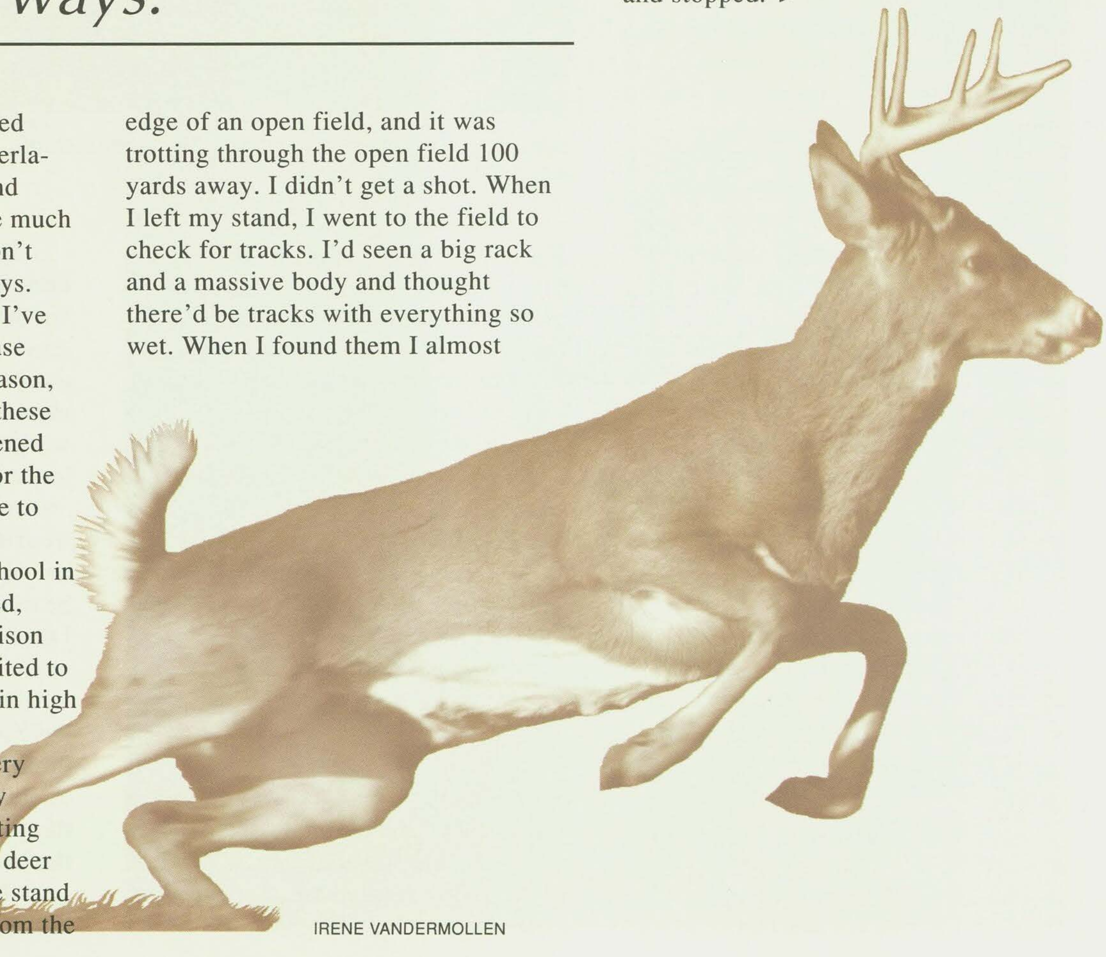
During 41 years of hunting, I've developed several techniques I use repeatedly. Until last hunting season, I'd have said I never fail to use these techniques, but something happened that changed the way I'll hunt for the rest of my life. A buck taught me to never say "never."

I coach football at a high school in Tallahassee. Kip, a boy I coached, lives on a 900-acre farm in Madison County. The first time I was invited to hunt this land, Kip was a junior in high school.

I didn't hunt the property very hard that first year, but one rainy morning near the end of the hunting season I saw the biggest Florida deer I'd ever seen. I was in a portable stand about 60 yards into the woods from the edge of an open field, and it was trotting through the open field 100 yards away. I didn't get a shot. When I left my stand, I went to the field to check for tracks. I'd seen a big rack and a massive body and thought there'd be tracks with everything so wet. When I found them I almost fainted. They were huge. You just don't see tracks like that in Florida. That day was near the end of the hunting season. I'm sorry to say I didn't see that deer again. But I was excited to know that he'd made it through the season.

I have so many other places to hunt that I just didn't get around to hunting this property the next two years. No one else hunted there either. Kip was busy with football since he had earned a full scholarship to East Tennessee State.

One morning last year, while Kip was home for a long Christmas vacation, he was on his way to a stand he'd been hunting on the edge of a large field. He was late and it was already light. He looked toward his stand, and 20 yards from the tree he was supposed to be in stood a monster buck. Dropping to one knee, he could just make out the deer's profile over the tops of the dog fennel. He aimed his scoped .243 and squeezed off a round. Clean miss. The deer bolted. It ran 20 yards and stopped. ▷



IRENE VANDERMOLLEN

Kip now had a better shot. He squeezed off the second shot before he had a chance to get excited. The buck disappeared. Kip was sure he'd missed again. He stepped off 160 paces to where he'd last seen the deer. Fifteen yards from that spot, Kip's trophy was on the ground – felled by a heart/lung shot.

The deer dressed out at 210 pounds. It was a typical 10-pointer that scored 128 B & C points. Kip's comment to me was, "I don't understand. I killed the deer of my lifetime doing something I tell people never to do. I was so late getting to my stand!"

Kip's early season success made me lose most of my enthusiasm for hunting his property. But when he invited me, I wanted to see him and find out what he'd learned about being a receiver in college, so I said yes.

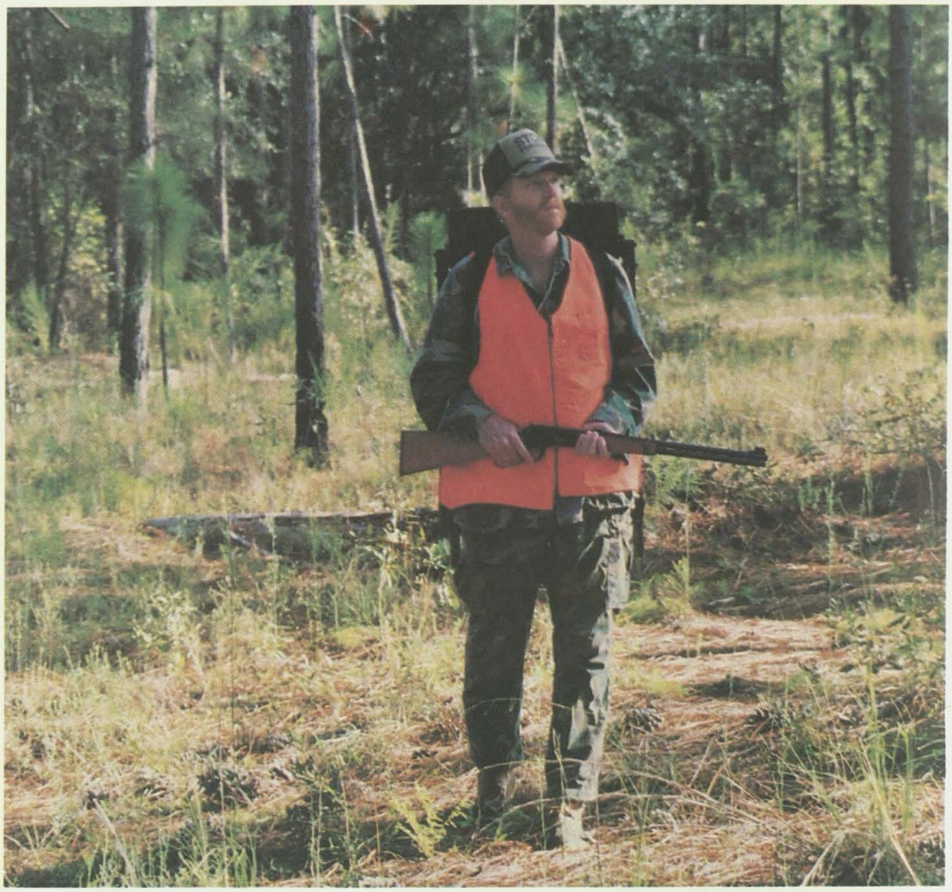
We met one night and talked football for several minutes. Then we got down to serious hunting stories. I heard the one above and was treated to a look at the head, which was in a freezer in the barn waiting to be sent to the taxidermist.

Kip assured me that other bucks were still using the property so we discussed our hunting strategies and safety precautions. The next morning at 5 a.m. I was knocking on Kip's door.

We left the house right away. Kip had decided to continue to hunt the same area he'd taken his 10-pointer. I planned to go down into the swamp along the Aucilla River. A strip of bottomland hardwoods paralleled the river for about a mile and varied in width from 150 to 400 yards.

Fifty yards into the swamp I'd seen enough sign to get me excited about hunting again. I found several rubs, numerous tracks and one scrape in the short distance I traveled from the open field toward the edge of the river.

A hundred yards farther, I discovered the second of five active scrapes paralleling the river. Forty yards from this scrape line, I placed my portable stand in a sweetgum and climbed to a height of 25 feet. A breeze was blowing from the river and soon the ground was covered with a 10-foot blanket of fog. When the sun came up, the sky was blue but the ground was as white as freshly fallen snow.


BILL BURGIN

*"I was simply hunting a buck that was unpredictable. I decided I needed to be unpredictable, too."*

I heard a deer approach. It was cautious. "Only a buck is this cautious," I thought. The problem was, I couldn't see anything on the ground!

I hadn't heard anything for a few minutes when the rolling fog cleared enough to give me a glimpse of the forest floor. I surveyed the cleared area without moving my head. On the fringe of the now-wispy fog, I spotted a rack. There were lots of points. Eight or more. Just then the fog rolled in thicker and obscured the deer. I lowered my rifle but could see no target. I waited. Two minutes passed. Finally, the fog cleared again. He was gone.

That same chain of events occurred two days later in the same tree. On that occasion, I didn't get quite as good a look at the buck. He was farther away when the fog thinned. He was moving directly toward me, but the fog was too thick to make him out when I heard him right in front of my tree.

As is my habit, I stayed in that tree from dark till dark for several days. I had figured the pattern of the squirrels, beaver, armadillo and wood ducks, but I couldn't predict the buck's next move.

On Dec. 31, hunting conditions were perfect. A front had blown through and the nights were cold due to clear skies. The most significant thing about this morning, though, was the lack of fog.

"If he shows this morning, I'll get him," I hoped.

He didn't! By 9 o'clock I was frustrated because on the mornings I'd seen him, it had been long before 9. It was as though he knew my every move. But he didn't even know I was there. I was simply hunting a buck that was unpredictable. I decided I needed to be unpredictable, too. So at five minutes after 9 a.m., I did something I never do. I moved!

With my tree stand on my back, I started a half-mile trek further into the swamp. I sounded like an elephant dragging a hundred tin cans. The branches hitting the metal tree stand got so loud at one point that I started laughing. After an hour, I found an intersection of two well-used deer trails. I climbed a cypress tree with my portable stand in the hope of spotting my buck going back to his scrape line at sunset.

It was 10 o'clock when I was ready to hunt. I wasn't particularly still because I didn't think this tree would be very productive until dusk.

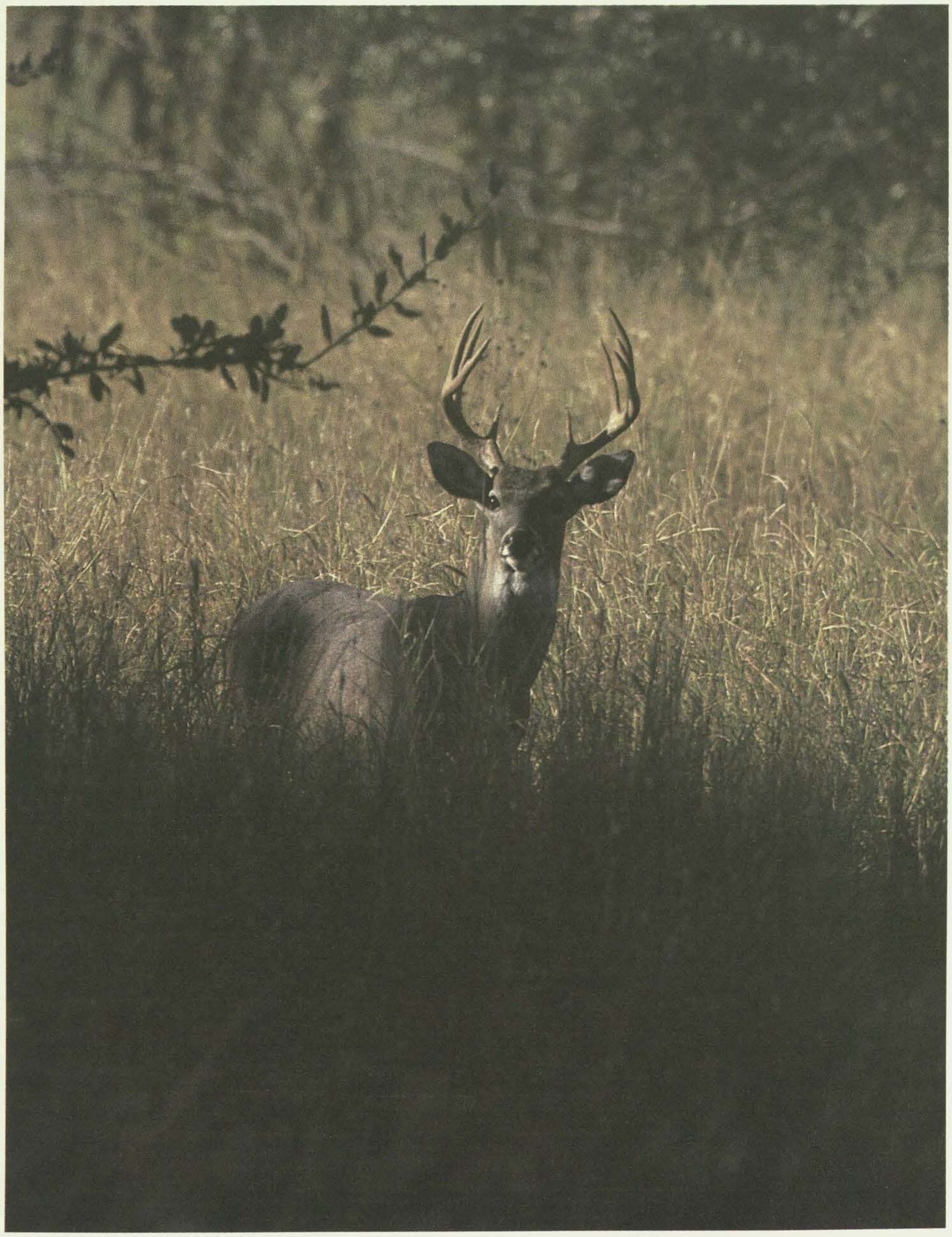
Looking south at 10:30, I saw movement to my right at the river's edge. I took in as much of the swamp as possible by scanning in small circles. Another movement. I was never so disappointed to see a 6-pointer in all my life. But I figured with the amount of noise I'd just made, I was lucky to see any deer at all. I waited for him to look away and lowered my rifle for a shot. At one point I actually started to squeeze the trigger when I noticed this 6-pointer was acting strange. Most bucks traveling alone look carefully in every direction before taking a step. This buck had started and stopped twice with his stare riveted straight ahead. He was watching the signal of a deer ahead of him!

I slowly moved my eyes, then my head, to my extreme right. Wow! What a buck! Standing in an opening in the swamp in direct sunlight was a huge 10-point buck. As soon as I saw him he turned his head away from me, back toward the river. Then the 6-pointer turned the same way. They may have been looking back at does traveling with them. I changed my point of aim to the big buck's neck. It was difficult to turn in my stand for a right-handed shot. His head came back straight ahead. I squeezed off a round from my iron-sighted 30-30. The buck was on the ground.

Big bucks never travel with other bucks during the rut. Ten-pointers are never killed at 10:30 in the morning. Mature bucks never stand in the open in the sunlight. Hunters never make a lot of noise before taking trophy deer. Two 200-pound, 10-pointers are never taken from the same farm in Florida.

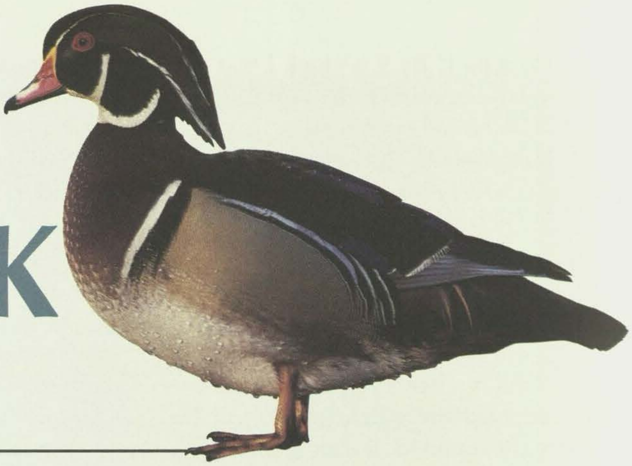
Well, almost never.

*Duke Hammond, who has been an avid hunter since he was 9, coordinates the Commission's participation in the Surface Water Improvement and Management program.*



GABE THOMAS

# *Hunting the Elusive* WOOD DUCK



By Paul M. Allen

Hunting the magnificent wood duck is a real challenge. It flies like a bullet. Coming across the trees at crown level and spotting a bit of water in the timber, it will turn on a dime and plunge through the trees at breakneck speed to the water.

These ducks rest on open ponds at night and at the break of day fly into heavily wooded areas to feed and loaf. Acorns and cypress balls are among their favorite foods here in Florida.

The wood duck gathers and flies in small flocks that usually range from four to a dozen birds. They are extremely fast in the air and are distinguished in flight by the shrill whistling cry of the female.

Jumpshooting, or hunting by flushing the birds before you, is a great way to get the duck. This fine bird is no fool, however, and it refuses to stick around in a spot if overshot. Full camouflage for hunting is a necessity, and the best hunting gun is a 12-gauge shotgun with improved choke, using high base shells with steel No. 4 shot. The shooting limit is two wood ducks per day.

One day last winter I received a phone call from Jim Whitaker, a friend of mine and foreman of a ranch in central Florida. He yelled over the phone, "Them wood ducks has been pourin' into the swamp below the barn for a week. You better git on over here this Saturday if yore aimin' to git some of 'em."

Saturday morning found me driving into the ranch, well before dawn. The sky was loaded with stars and a bright moon. The temperature was about 60 degrees. It would be a beautiful morning for a hunt.

Parking the pick-up at the barn, I donned complete camo, pulled on my hip waders, grabbed my 12-gauge and shells and headed for the swamp that lay in shadows below the barn.

Fog drifted wraithlike among the trees as I eased into the dark waters. Wading some 50 yards into the timber, I set up behind three large cypress trees that grew close together and waited for dawn.

Fifteen minutes later, as the pinks of dawn hit the morning skies, I heard the piercing, whistling cry of a female wood duck as the birds started to come in. A minute later, six birds roared in over the swamp and landed about 50 yards to the right of my position. I decided to wait a little bit for the ducks to settle in. I could hear the spat, spat of their wings on the surface of the water as they moved around.

As I started to wade toward the area where the ducks seemed to be, five more birds ripped in over the trees at breakneck speed. Upon spotting the ducks already on the surface of the water, they turned inside out, put on the brakes and dropped toward the water like plummets.

Again I started to move toward the ducks, figuring that under the circumstances, I should be able to take my limit of two wood ducks and be back at the truck within a short time.

As I slowly closed the distance, the alarm cry of a wood duck sounded. The unmistakable "cre-e-k, cre-e-k" of the birds signaled that they knew that I was in the water with them.

Since I had not glimpsed the first bird among the maze of trees in the swamp, I knew they were moving in front of me and away.

I moved steadily forward with shotgun ready. I fully expected the birds to explode from the water at any time but they didn't. They knew they were safer on the water.

I slowly became aware that the birds had out-foxed me by staying just ahead of me. At 10 in the morning I wearily dragged myself back out of the swamp, having seen nothing nor fired a shot.

I could not despair. I hunt this duck often and before many days had passed I had returned and taken my limit of two.

The woody offers the best in a day's duck hunt. It is my favorite, and the result of a fine wood duck hunt is the eating that follows. If you have not tried this gourmet duck basted in peach juice and baked to a turn, you have missed a treat.

*Paul M. Allen is an accountant who has hunted and fished for 50 years. He lives in Largo.*

# 1994-95 Resident Game Hunting Seasons

| | **Season Dates** | **Daily bag limit-possession limit** |
|---|---|---|
| **General gun (antlered white-tailed deer and wild hog, where classified as game)** | Northwest Zone: Nov. 24-27 & Dec. 10 - Feb. 15<br>Central Zone: Nov. 12 - Jan. 22<br>South Zone: Oct. 29 - Jan. 8 | 2 - 4 (deer)<br>1 - 2 (wild hog) |
| **Antlerless deer** | Northwest Zone: Dec. 17-18<br>Central Zone: Nov. 19-20<br>South Zone: Nov. 5-6 | 1 antlerless deer per day, 2 per season, possession limit 2 |
| **Fall turkey (Bearded turkeys or gobblers only)** | Northwest Zone: Nov. 24-27 & Dec. 10 - Jan. 15<br>Central Zone: Nov. 12 - Jan. 8<br>South Zone: Nov. 12 - Jan. 8 | 1 - 2<br>(Season limit 2) |
| **Spring turkey (Bearded turkeys or gobblers only)** | Northwest Zone: March 18 - April 23<br>Central Zone: March 18 - April 23<br>South Zone: March 4 - April 9<br>1/2 hour before sunrise to 1 p.m. | 1 - 2<br>(Season limit 2) |
| **Bobwhite quail** | Nov. 12 - March 5 | 12 - 24 |
| **Rabbit** | All year | 12 - 24 |
| **Raccoon, opossum, coyote, skunk, nutria & beaver** | All year | none |
| **Gray squirrel** | Nov. 12 - March 5 | 12 - 24 |
| **Fox squirrel**<br>(Except in Lee, Hendry, Palm Beach, Monroe, Collier, Broward and Dade counties or on wildlife management areas) | Nov. 12 - March 5 | 2 - 4 |
| **Bobcat, otter and mink**<br>(No more than one untagged bobcat or otter in possession. Fox, Everglades mink, weasel and round-tailed muskrat may not be taken at any time.) | Dec. 1 - March 1 | none |

## 1994-95 Special Hunting Seasons

**Archery**
Northwest Zone: Oct. 15 - Nov. 13
Central Zone: Sept. 24 - Oct. 23
South Zone: Sept. 10 - Oct. 9

Legal to take: deer of either sex (except spotted fawns), turkeys of either sex, squirrels, quail, rabbits, raccoons, opossums, coyotes, skunks, nutrias, beavers and wild hogs with a shoulder height of 15 inches or more in areas where hogs are legal game.

**Muzzleloading Gun**
Northwest Zone: Nov. 18-20
Central Zone: Oct. 29 - Nov. 6
South Zone: Oct. 15-23

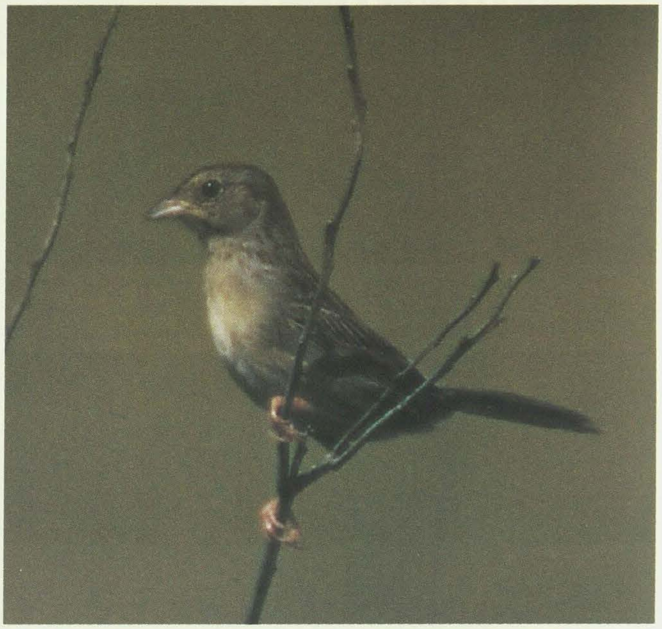
Legal to take: deer having one or more antlers at least 5 inches in length visible above the hairline, turkeys of either sex, squirrels, quail, rabbits, raccoons, opossums, coyotes, skunks, nutrias, beavers and wild hogs having a shoulder height of 15 inches or more in areas where hogs are legal game.

**Special Archery & Muzzleloading Gun**
Northwest Zone only: Feb. 16-26

Legal to take: deer having one or more antlers at least 5 inches in length visible above the hairline, squirrels, quail, rabbits, raccoons, opossums, coyotes, skunks, nutrias, beavers and wild hogs having a shoulder height of 15 inches or more in areas where hogs are legal game.

***Seasons may vary on wildlife management areas. Seasons for migratory game birds and falconry have not been finalized.**

# Delicate BALANCE



MICHAEL F. DELANY

**Species: Bachman's Sparrow (*Aimophila aestivalis*)**

**State and Federal Status: Under review for listing.**

Wildlife populations naturally fluctuate over time and space in response to changing environmental conditions. However, indication of a steadily declining population of Bachman's sparrows is a serious matter. This southeastern sparrow is considered extirpated in Maryland, and classified by Tennessee and Virginia as endangered and by Georgia as rare. According to breeding bird surveys, Florida maintains a relatively abundant population, however.

Compared to other sparrows, the adult Bachman's sparrow is drab and unstreaked, its color varying from gray-brown in southern populations to reddish-brown in the northern and western parts of its range. This nondescript plumage, ironically, is itself an aid in identification. Identifiable field marks include a long, dark bill and long, rounded tail.

What the Bachman's sparrow lacks in appearance it makes up for in voice. Males sing from shrubs and the lower branches of tall pines. The distinctive, ethereal song begins with a loud, clear whistle that is followed by a series of notes in a different pitch. This otherwise-elusive bird is a persistent singer between March and August.

The female constructs a domed grass nest on the ground after first scraping out a shallow depression. Nests are often shielded by a clump of grass or saw palmetto, and are difficult to find. The three to five glossy white eggs hatch during May, and the young leave the nest after 10 days. Usually, two nests are attempted each year.

John James Audubon named this sparrow after Lutheran minister John Bachman, who discovered the species near Charleston, South Carolina in 1832. Audubon stayed at Bachman's mansion while collecting Southern birds and showed his appreciation by "honoring so humble an object as the Finch" with the name of his host. Because hunting dogs can be distracted by the scent of ground-dwelling sparrows, like Bachman's, some quail hunters in Florida refer to them as "stink birds."

Another common name for the Southern race of this species is pinewoods sparrow because it originally inhabited grassy openings in mature longleaf pine forests. Habitat requirements include open pinelands with a ground cover of grasses and forbs, but little to no understory trees and shrubs. The adaptable Bachman's sparrow also uses replanted clearcuts and early successional stages of overgrown agricultural fields and pastures.

During the early 1900s, the range of the Bachman's sparrow expanded north and west to Ohio and Illinois as logging created more available habitat. Since the 1930s, however, the sparrow's range has retracted with the development of unsuitable secondary vegetation. A more-recent population decline in the southern, traditional portion of its range may be due to the conversion of open longleaf pine forests to dense pine monocultures. The exclusion of fire also may contribute to habitat loss by allowing the development of dense understory vegetation.

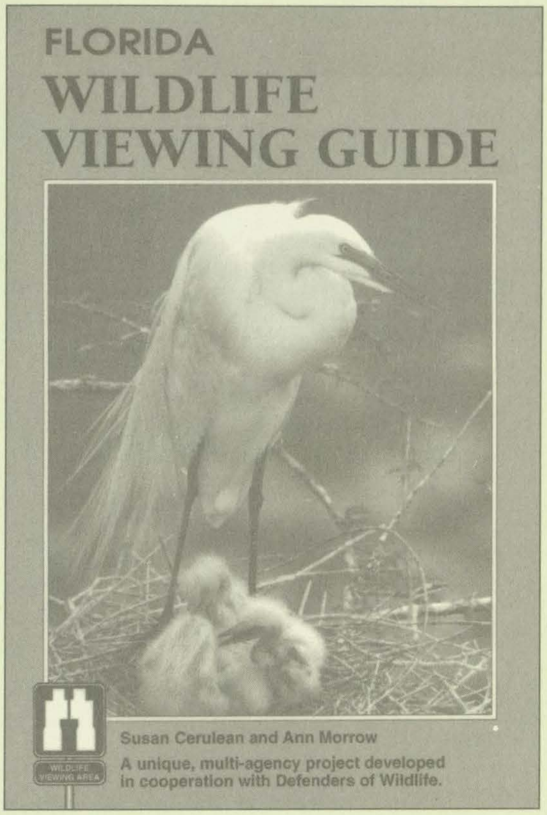
Timber management designed to benefit the endangered red-cockaded woodpecker also helps the Bachman's sparrow. Frequent burning of pine forests maintains suitable habitat by removing understory shrubs and encouraging grasses. Thinning dense stands of pines also allows use by the sparrow.

With accurate status information and proper management, we can continue to enjoy this "humble" representative of our Southern pinelands.

– Michael F. Delany

# Plan a winter adventure.

## *See Florida's Wild Side*



FLORIDA

WILDLIFE VIEWING GUIDE

Susan Cerulean and Ann Morrow

A unique, multi-agency project developed in cooperation with Defenders of Wildlife.

Fall and winter are the premium times to view Florida wildlife. Florida has an abundant diversity of wildlife that we'd like for you to see. In fact, there are 96 premier wildlife viewing areas in Florida.

When you purchase $21 in new, renewal or gift subscriptions to FLORIDA WILDLIFE, we'll give you a **FREE** copy of the new ***Florida Wildlife Viewing Guide*** (retail value $7.95). This full-color book by Susan Cerulean and Ann Morrow tells you where to see endangered Florida manatees, monarch butterflies in migration, and flocks of lovely herons and egrets.

Act now, before our rates go up October 1, to extend your subscription or give the gift of FLORIDA WILDLIFE, and get your copy of the ***Florida Wildlife Viewing Guide***. After October 1, $27 plus $2 shipping and handling.

**A subscription for YOURSELF**

Renewing? Please enclose your mailing label if possible.

Your Name ______________________________

Address ______________________________

City ______________ State/Zip + 4 ____________

Phone ______________________________

____1 Year $7 ____New
____2 Years $14 ____Renewal
____3 Years $21 ____Donor

**Shipping & Handling:** Add $2.00 per book.
**Foreign Rate:** Add $5.00 postage per year.

Send a check or money order payable to FLORIDA WILDLIFE and this form (or a photocopy) to:

**FLORIDA WILDLIFE, Circulation Office, 620 South Meridian St., Tallahassee, FL 32399-1600**

Allow 6 to 8 weeks for delivery.

**GIFT subscriptions**

Will receive attractive gift card.

Recipient ______________________________

Address ______________________________

City ______________ State/Zip + 4 ____________

____1 Year $7 ___2 Years $14 ____3 Years $21
____New ____Renewal

Recipient ______________________________

Address ______________________________

City ______________ State/Zip + 4 ____________

____1 Year $7 ___2 Years $14 ____3 Years $21
____New ____Renewal

Recipient ______________________________

Address ______________________________

City ______________ State/Zip + 4 ____________

____1 Year $7 ___2 Years $14 ____3 Years $21
____New ____Renewal